THE
RAILWAY GAZETTE
A Journal of Management, Engineering and Operation
INCORPORATING
Railway Engineer · TRANSPORT · The Railway News
The Railway Times · Herapath's Railway Journal · RAILWAY RECORD.
RAILWAYS ILLUSTRATED · ESTABLISHED 1835 · RAILWAY OFFICIAL GAZETTE

PUBLISHED EVERY FRIDAY
AT
33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1

Telegraphic Address: "TRAZETTE PARL., LONDON"
Telephone No.: WHITEHALL 9233 (8 lines)

Annual subscription payable in advance and postage free
British Isles and Abroad .....£2 5s. 0d.
Single Copies .....One Shilling
Registered at the General Post Office, London, as a Newspaper

VOL. 81 No. 12 FRIDAY, SEPTEMBER 22, 1944

CONTENTS

	PAGE
Editorial Notes	273
Rates Tribunal First Registrar	275
Third Railway Valuation Roll	275
Tourist Traffic: Exports: External Debt	276
A Year's Traffic at Montreal	277
Letters to the Editor	278
Publications Received	278
The Scrap Heap	279
Overseas Railway Affairs	280
How Long Can a Rail Be?	281
Tapered Roller Bearings on the L.M.S.R. Turbo-motive	282
Electric Traction Section	283
Personal	285
Railways and Flying Bomb Damage	286
Transport Services and the War	291
Stock Market and Table	296

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as indicating that they are available for export

NOTICE TO SUBSCRIBERS

Consequent on the paper rationing, new subscribers cannot be accepted until further notice. Any applications will be put on a waiting list and will be dealt with in rotation in replacement of subscribers who do not renew their subscriptions

POSTING "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE *possesses the necessary permit and facilities for such dispatch.*

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:
Mondays to Fridays 9.30 *a.m. till* 5.30 *p.m.*
The office is closed on Saturdays

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

ERRORS, PAPER, AND PRINTING

Owing to shortage of staff and altered printing arrangements due to the war, and less time available for proof reading, we ask our readers' indulgence for typographical and other errors they may observe from time to time, also for poorer paper and printing compared with pre-war standards

Engineering Statistics

WE have frequently urged the need for a lifting of the statistical blackout, more particularly as it relates to the railway industry. With the increasing urgency of the need to plan for the post-war problems, which come ever nearer, the case for more and better statistics throughout the whole range of British industry becomes more pressing. *The Financial News* thinks there has been too little public examination of the possibilities of adapting the kind of information used for war production purposes to peacetime requirements, and points out that those sections of industry which have played the most important part in the war effort, were least well served by official statistics before the war. The need to attain maximum output and full utilisation of resources has compelled the development of a close, and sometimes novel, system of statistical and informational control during the war, and this is most marked in the engineering and allied industries. Because of their expansion and the pattern of Great Britain's post-war economy, these industries are destined to present at once the most formidable problems and the greatest opportunities. In capacity, numbers employed and productivity, great strides have been made in most branches of the engineering and metal industries, but there has been singularly little discussion of the precise rôle of engineering when armament orders tail off.

The Post-War Problem

Undoubtedly, there will be some shrinkage in the engineering industries after the war, when a number of women and dilutees return to their normal employment, but a contraction to pre-war dimensions is neither possible nor desirable. After the war it will be more necessary to find productive employment for efficient engineering and personnel than ever before under peace conditions. The objectives should be to use our enhanced capacity to re-equip British industry and to expand to the maximum our exports of engineering and allied products. To achieve the best use of engineering capacity in this country, it will be essential to know what capacity is available (in addition to labour and materials) before each stage in the scale of priorities can be put into operation. The whole business will be at least as complicated as organising war production. If the Government is to take a hand in promoting the development of great new export markets, it may be necessary to supervise production of complicated engineering products by heterogeneous groups of firms. If, as envisaged in the White Paper on employment, Government policy requires that production should be linked with consumption, savings, and investment, and the balance of foreign payments, a very close and accurate picture of what is going on in the principal capital goods industry—engineering—will be essential.

Hiding our Light under a Bushel

Readers of both the technical and general Press of the Allied world may be forgiven if they reach the conclusion that most of the recent technical and engineering achievements in this war have come from the U.S.A. Although the Americans have certainly made many valuable contributions in these fields, equally giant strides have in fact been taken by British industry. Where the Americans have scored most heavily over the British is in their comparative freedom to tell the world all about it. British technical and other journals, besides being greatly handicapped in respect of the quantity and quality of paper available, have to contend with a censorship which suppresses or postpones indefinitely all but a few of the stories of British inventions. In America the censorship is far less rigid in its interpretation of "war security," with the result that the British Press finds itself forced to draw upon the American stream of material, while the accounts of British triumphs gather dust in pigeon-holes till after the war, when the interest in war inventions will be half dead. American publishers, moreover, enjoy relatively ample supplies of paper. As the Managing Director of an important British firm of trade and technical publishers recently pointed out, "austerity journals, like utility dresses, are unsuitable for export."

The Future of Machine Tools

The suggestion that the machine tool industry of the aggressor countries should be drastically controlled after the war, and that it is equally important that the machine tool makers of the Allied nations, and particularly by Great Britain, should flourish is made by Sir Alfred Herbert in our contemporary, *The Engineer*. He refutes the suggestion sometimes heard that machine tools can be divided into those which are applicable only to peacetime industry, and those which are essential for war work, and that it is possible to control the latter without troubling about the former. There is no machine tool which is not capable of being used for the production of munitions in some form or another, and there are few machines which are used for war purposes which are not

also useful in peacetime production. Because the volume of domestic machine tool business has been so small in peacetime, the British machine tool industry over many years has had to build up an export trade all over the world, with the exception of the United States, where tariffs have prevented the entry of our products.

Loss of Markets

During the war it has been impossible for the industry to maintain its foreign connections. When the demand for machine tools far exceeded the available supplies, the requirements of our overseas markets were submitted to joint consultative bodies, who decided whether these should be met from British or American resources, and, as shipping was then the main difficulty, American machine tools were almost invariably chosen. As a result, the Canadian demand was filled almost exclusively from America, and to a large extent the same may be said of India, Australia, South Africa, and New Zealand. At the present time American machine tools are still being supplied to markets which were formerly British; United States makers assiduously are cultivating foreign markets. Moreover, the United States has granted very large dollar credits to the U.S.S.R., to be used, among other things, for the purchase of American machine tools. Sir Alfred Herbert fears that a position may be reached in which it will be found that our former overseas markets have been appropriated by America. He advocates that the question of export, not only of machine tools but of British manufactures generally, should be a Cabinet question and urges that immediate action is needed in view of the gravity of the situation.

Combined Operations and the Future of Transport

An interesting scheme has been launched by the L.M.S.R. staff journal *Carry On* seeking views and ideas for the development of transport after the war, which are to be addressed in the form of letters to "Onward," Room 14, Central Offices, Euston Station, N.W.1. "Onward" has launched the idea by an article on the "Future of Transport," in which he says that this is not a political discussion on the future of railways, and has nothing to do with private enterprise, nationalisation, State or any other kind of control. It is concerned simply with the technical job of moving persons and things as quickly, as cheaply, and as comfortably as possible. Without being dogmatic, he suggests that the keynote is to be found in what we have come to call in war "combined operations," and that for the future we should think about *transport* instead of *railway*. He realises that it is natural for railwaymen to think in terms of railways, and records what is now fairly widely recognised, namely, that the war has emphasised that the largest part of the transport organisation is the railway. Nevertheless, combined operations, as applied to war, are designed primarily to eliminate waste, and the fundamental principle is to employ every part of the force engaged in the most efficient and economic way, irrespective of the service to which it belongs, having regard to the objective to be obtained. Thus, railway transport, road transport, and air transport, as three self-contained units with a separate significance, with efforts to retain traffic for one at the expense of the other, should be regarded as wasteful duplication. War always brings technical changes, and these will have to be applied to post-war needs. It is possible that some worthwhile ideas may result from this scheme, and we look forward to its development.

Argentine Trade with Great Britain

The position of the British-owned railways in Argentina still awaits clarification, but it is believed that with the progress of the war towards victory for the United Nations, the factor of post-war trade may play an increasingly important part in relations between the two countries. Recently in *The Railway Stockholder*, the organ af the British Railway Stockholder's Union, Mr. C. W. E. Duley points out that the British Empire for long has been the largest buyer of Argentine exports, and its purchases far outweigh sales to Argentina, as is shown by the following figures from the last annual report of the Central Bank :—

	Exports to British Empire	Imports from British Empire (£ millions)	Balance in favour of Argentina
Average 1937-39	43	28	15
,, 1941	41	23	17
,, 1942	51	20	31
,, 1943	66	16	50

Obviously, Argentina will wish to retain the goodwill of her best customer and in the event of the nationalisation of the British-owned railways, it is hard to believe that, in her own interest, Argentina would offer a price for the railways less than that established in accordance with the Mitre Law. This figure of recognised capital, as declared by the Argentine General Railway Board, is £234,817,638. This is based on a peso exchange rate of 13·50 to the £, the present official buying rate. Most of the capital invested in the lines was transmitted when the value of the peso was 11·45 to the £, so that the present rate shows a heavy depreciation.

The Buenos Aires Transport Corporation

The efforts at transport co-ordination in Buenos Aires appear to have satisfied neither the travelling public nor the former owners of the properties that were merged into the Buenos Aires Transport Corporation, as indeed was only to be expected when it is realised that there was no clearly-defined objective behind the arrangements. The losses still being incurred by the corporation show conclusively that the travelling public of Buenos Aires is getting its journeys at less than cost, as has been the case now for many years, while the major part of the system under the control of the corporation continues to suffer deterioration at an ever-increasing rate, as the result of long neglect through lack of funds and of essential renewals and maintenance. That this financial shortage is in no measure due to the service of debt was clearly shown by Sir Bernard Docker a fortnight ago at the sixtieth ordinary general meeting of the Anglo-Argentine Tramways Co. Ltd., which had to surrender its operating properties in return for stock. He had a shabby story to tell of official manœuvres to avoid meeting agreed obligations and said, quite truly, that it was not easy to comment without restraint upon continued failure to honour contractual obligations. As he said, "the company remains the victim of circumstances in Argentina entirely beyond its control, and has had a raw deal." If it is the desire of the Argentine Government that transport services should be given at uneconomic fares, financial provision should be made to this end. Meanwhile, it appears that safety is being impaired and financial obligations ignored.

Railways and the Flying Bomb

It must have proved surprising to many regular travellers in the Greater London area who have had opportunities of seeing something of the damage caused by the flying bomb attack, that no mention has been made until the last few days of the effect of this attack on the railways, although damage to prominent buildings was duly recorded after the elapse of a due interval to meet security considerations. The reason, of course, is that railways are military targets, and there are severe limitations on what may be said permissibly about damage thereto. After Mr. Duncan Sandys had given his comprehensive account a fortnight ago, the position became easier, and we are now enabled to give some impression of representative emergency engineering works that have been involved in keeping the railways running. This information has been prepared with the co-operation of the railways, and with the concurrence of the Censor. In the vast majority of cases the effect of a flying bomb exploding on or near railway properties was confined to extensive blast damage, which was capable of rapid emergency repair and early restoration of traffic. In a few cases however, bridges and other structures were involved, and the work in connection with some examples is described and illustrated at pages 286-290.

Bombay, Baroda & Central India Railway

The directors of the Bombay, Baroda & Central India Railway Company have issued a circular to stockholders explaining the reasons for the delay in the final distribution of assets and the winding up of the company. Since the company's management of the lines ceased on December 31, 1941, two interim distributions have been made—one of 100 per cent. on June 16, 1942, and the other of 7½ per cent. (1½ per cent. was paid less tax) on December 15, 1942. The negotiations with the Government of India as to the surplus profits due to the company in respect of the working of the railway for the last nine months of the contract were protracted, and the final figure was not accepted by the Government until February, 1944. Immediate steps were taken to establish the company's liability for the United Kingdom, Indian income-tax, and E.P.T., but difficulty is being experienced in arriving at a settlement, although the directors are making every effort to avoid delay. As soon as agreement has been reached, the directors hope to be in a position, after obtaining the refunds due in respect of double taxation, to make the final distribution of assets and proceed with the dissolution of the company.

Sale of the C.P.R. Hotel Site in London

The announcement was made on September 15 that the Canadian Pacific Railway Company had sold its freehold interest in Berkeley Square House, Mayfair, a site which includes the house (No. 17, Bruton Street) which was the former residence of the Earl and Countess Strathmore, the Queen's parents, and, moreover, the place where she was living at the time of her

marriage to the King, and where Princess Elizabeth was born. The site of Berkeley Square House occupies almost the whole of the east side of Berkeley Square, extending to nearly 2 acres, and it is stated to have been purchased by trustees as a permanent investment at a price approaching £1,250,000; it is thus one of the most important property transactions which has taken place in London in recent years. It may be recalled that this site was purchased by the Canadian Pacific Railway in 1931 from the Samuel Estates, which the late Lord Bearsted (then Sir Marcus Samuel) had bought from Lord Berkeley in 1919. At that time the C.P.R. contemplated building an important London hotel, but in 1936 the C.P.R. let the site on building lease, and Berkeley Square House, which has office accommodation for about 2,500 persons, was erected. At present it houses, among other Government offices, the Ministry of War Transport.

Brazil as a Market for Railway Equipment

According to a statement made by the Brazilian Commission for Inter-American Development, reported by Reuters, Brazil is in need of large quantities of railway equipment of all kinds. This report adds that many projects at present are either under way or are planned for new railway lines, and also for the improvement of existing lines, and that these will call for large quantities of equipment, material, and machinery. The Commission states that the Brazilian Government, at present, is most interested in connecting the railways in the south and in the north, so as to improve communication between these two parts of the country. Credits to enable this to be done by the construction of new railways are stated to have been extended by the Government, but at the present time a matter of more immediate concern is that of keeping open the existing routes and preserving the present flows of traffic. Before the war British railway equipment manufacturers carried out a number of important contracts in the development of Brazil's railway system. Work of this kind has had to be suspended during the war, but after the end of European hostilities British undertakings will be ready to play their part in developing the great natural resources of Brazil.

The Length of Rails

During recent years much attention has been directed to the length of rails. Every increase in length has its advantage in reducing the number of rail-joints, which require a disproportionately high proportion of the time and attention devoted to track maintenance; against undue increase of length are the difficulties of handling, particularly in course of manufacture. In Great Britain the standard length has advanced by degrees to 60 ft., and two British railways have used rails 90 ft. and even 120 ft. that have been produced and delivered from the mills in these lengths; in Germany, also, the standard rail length for some time has been 30 metres (99 ft. 5 in.). Such has been the improvement in the technique of rail welding that the time has now come when it is probably cheaper to weld rails into long lengths than to pay the extra cost charged by the mills for lengths in excess of 60 ft.; and for this reason it is possible that 60 ft. will remain the optimum in manufacture, so far as this country is concerned. As to the maximum practical length that can be laid in the track, produced by continuous welding, it would appear from the article on p. 281, describing modern American rail-welding practice, that there is little or no practical limit, other than that set by switch and crossing work or the insulated joints required in connection with track circuit. In particular, expansion and contraction give no difficulty at all, for the varied restraints imposed on the welded rail by friction on sleeper-plates, by anti-creepers or anchors, and by the rail-joint assembly, are more than sufficient in America to counteract the internal stresses in the rail set up by temperature changes.

Post-War Locomotive Exports

With the end of the war in Europe there will undoubtedly be a heavy demand for locomotives, and it is clear from the speech by Mr. W. C. Dickerman, Chairman of the American Locomotive Company, at the recent annual meeting, that the United States' builders have this well in mind. He estimated that at least 15 per cent. and possibly 25 per cent. of the approximately 157,000 locomotives outside the United States and Canada would need to be replaced or materially rebuilt after the war and that in the early stages this business would come to the United States and Great Britain. As the locomotive plants in the occupied countries were rehabilitated, national requirements would be built within those countries, and later orders for locomotives from South America, Asia, and Africa would have to be shared with European builders. The company expected a substantial oil engine market after the war, Mr. Dickerman continued. Although the great bulk of locomotives in America were steam, oil-engine traction was making rapid progress and would continue to do so after the war.

Rates Tribunal First Registrar

MR. T. J. D. ATKINSON, K.C., O.B.E., M.A., who has retired from the office of Registrar to the Railway Rates Tribunal, on account of ill-health, after nearly twenty-three years' service, was the first to hold that position. He has served under three Presidents, the late Sir Frank Gore-Browne, K.C., the late Sir Walter B. Clode, K.C., and Sir Bruce Thomas, K.C., and has been mainly responsible for building up the procedure of a body which, being newly-constituted, had no precedents for its guidance. He brought out the "Rules of Procedure" under the Railways Act, 1921. During the "Transitory Period" up to the "Appointed Day" (January 1, 1928) he had to deal with a large number of applications by traders and associations for general and particular reduction of charges in which the interlocutory proceedings were long and complicated, and none of his decisions on these matters was reversed. In the fixation of charges which involved the determination of Standard Revenue, Conditions of Carriage, etc., the Tribunal sat for nearly 150 days, of which 116 were taken up with Standard Revenue. Many points were settled at informal meetings of the representatives of the railways and traders in the intervals between the sittings of the Tribunal, on which occasions the Registrar acted as informal chairman. It is a great tribute to the work thus done behind the scenes that none of the many points then settled has ever been questioned. All the Orders of the Tribunal were drafted by the Registrar without precedent. None has ever been questioned as to jurisdiction or form.

The Freight Rebates Scheme under the Local Government Act, 1929, and "Agreed Charges" under the Road & Rail Traffic Act, 1933, brought heavy responsibilities, but informal discussions again evolved a simplification of procedure which has worked for many years without a hitch. The simplified procedure under which exceptional rates, classification matters, rebates, and agreed charges are dealt with was all originated by the Registrar. In April, 1940, he was appointed to act as Secretary of the Charges (Railway Control) Consultative Committee, and continued in that capacity until the committee was discharged.

Mr. Atkinson had a successful career at Trinity College, Dublin, on the Modern Side, where he was Medallist in Legal Science. He was called to the Irish Bar in 1904 and took silk in 1924. Jointly with Mr. L. R. Lipsett, he brought out in 1928 a valuable work on "The Law of Carriage by Railway in Great Britain & Ireland," which gives the text of the principal Acts relating to railways, including the Ministry of Transport Act, 1919, the Railways Act, 1921, and the Conditions of Carriage under it, and the (Irish Free State) Railways Act, 1924, with a statement of the railway law in operation in Northern Ireland at the date of publication.

Third Railway Valuation Roll

THE Railway Assessment Authority on September 8 completed both the part of the Third Railway Valuation Roll which relates to the London & North Eastern Railway Company and also the second London Passenger Transport Valuation Roll. These Rolls operate, for rating purposes, for the quinquennium 1941-1946, and the Authority has now completed for that period all the Rolls for which it is responsible. In completing the L.N.E.R. and the L.P.T.B. Rolls, the Authority rejected representations made by the London County Council that the cumulo net annual values (L.N.E.R. £1,281,553 and L.P.T.B. £850,000) should be increased. It also determined various representations by the L.N.E.R. and the L.P.T.B. and local authorities upon matters of apportionment and upon the inclusion and exclusion of properties in and from the Rolls. For example, in pursuance of such determinations, the High Barnet electrified lines of the L.N.E.R. have now been included in the L.P.T.B. Roll, and canteens run by caterers at the L.N.E.R. works and docks, and vacant storage grounds at the company's docks, have been excluded from the Roll relating to that company. On these matters the Authority has issued written decisions to the parties concerned.

The main block apportionments in these completed Rolls remain the same (or virtually the same) as in the draft Rolls, namely, L.N.E.R., principal undertaking £1,228,588 (Class A £982,870, and Class B £245,718), docks £51,682, canals £1,283; and L.P.T.B., railway passenger traffic £323,212, railway goods traffic £8,288, tramway traffic £110,500, and non-traffic £408,000. The resultant total rateable values are: L.N.E.R. £294,837 and

L.P.T.B., £726,010. These figures, of course, represent only the rateable values after the application of the de-rating provisions, and the total rate liability is not based upon them, as the companies have to pay to the Railway Freight Rebates Fund the equivalent of rates on the difference between these figures and the net annual value figures. It is now the duty of the assessment committees, throughout the L.N.E.R. and L.P.T.B. systems, to cause the entries in the Rolls (as completed) to be substituted in the valuation lists for the existing entries respectively, with effect from April, 1941. It is also now open to the rating authorities concerned to make proposals for the separate assessment of any premises which were included in the second L.N.E.R. Roll or the first L.P.T.B. Roll, as last revised, but are now excluded from the new Rolls as completed. These proposals, if made before the end of September, in the case of a half-yearly rate, and before the end of March in respect of a yearly rate, will take effect for rating purposes from April of this year. Appeals have been made to the Railway & Canal Commission Court by the London County Council against the *cumulos* in the parts of the Third Railway Valuation Roll which were previously completed, but the existence of these appeals in no way relieves the assessment committees of their duty to give effect to the completed rolls or affects the powers of the rating authorities to make appropriate proposals forthwith.

Tourist Traffic: Exports: External Debt

THE Travel & Industrial Development Association has published a memorandum* setting out its views on what should be done to promote tourist traffic in Great Britain after the war. The main proposals—which are bold and (it must be added) expensive—may be summarised as follow: (1) A national tourist organisation should be set up by the State, with an annual expenditure in a transition period up to £1,000,000, the greater part of which would be provided by the Government; thereafter the Government would provide up to £2,000,000 annually. (2) The tourist organisation would supplement and subsidise the component parts of the tourist industry by the collection of data, by overhauling the legal enactments and regulations affecting the industry, by seeking the co-operation of all sections of the business, by encouraging the hotel industry to supply services comparable with other tourist countries, by appointing representatives abroad, by active publicity, and by the establishment of information, reception, and guide services. It is hoped, as a result of this effort, that the value of tourist travel to the country could be raised from £32 millions (the total in 1929, the peak year) to £100 millions a year. This £100 millions would be " net," that is to say, it would be practically all gain and would be tantamount to an increase in our exports to this extent.

The background to these proposals is the future of British exports, with which must be linked the external debts as a result of the war. By the end of 1944 the external liabilities of this country will amount to £3,000,000,000, exclusive of Lend-Lease claims; thus after the war we shall be faced with a debt equal to the total value of our exports in about five pre-war years. If repayment were spread over a long period, it would require more than £100 millions of exports a year to meet it, with no return in imports, for we have already had them during the war. This would, of course, be in addition to the need for earning the foreign exchange to pay for ordinary imports, which because of losses of investments and shipping income is already a formidable task. It will be seen, therefore, that an increase in the value of tourist traffic of the order of £70 millions per annum, even if this could be attained, would be relatively " small beer " in itself; nevertheless, so serious will be the task facing this country it would be a very useful contribution. No one at this time could be precise about the prospects of achieving it; it might well be described as more of a hope than a promise.

Nevertheless, tourist travel to Great Britain was never fully developed before the war, mainly because of the lack of any centrally-directed effort and, on the whole, the unenterprising efforts of the catering and allied trades. It offers potentialities after the war, particularly in conjunction with the development of air travel, but to attract tourists on the scale contemplated we shall naturally have to cater for them. Even apart from war damage, no one can say that the standard of hotel accommodation in this country is good. The big first-class hotels, which are concentrated mainly in London or run by the railways in the provinces, are good, but the second and third class hotels are generally poor and are unlikely to attract tourists. The root of the matter is simply that the regular demand for accommodation is not sufficient to make them pay a reasonable return to enable them to be maintained and improved to the standard required. In London a hotel can be reasonably sure of bookings to permit of a six-day week and a good restaurant business, thus the standing charges can be spread. On the other hand, if a provincial hotel secures a regular four-day week in its bookings, it is doing well. A solution is, therefore, to organise the demand on provincial hotel accommodation so that it can be booked by the week, and to keep to a minimum the present method of coming and going at any time. The staggering of holidays should help in this. No doubt the war will produce new ideas for improving the hotels. It ought to be possible to find cheaper methods of construction that will not disturb the life of the hotel, and yet will reduce the capital outlay required. Apart from this, additional hotel accommodation will undoubtedly be required immediately the war is over, and the Government might well assist by advancing loans at a low rate of interest repayable over a long period of years.

There are many other aspects of the catering business that need overhauling if the tourist is to be attracted in the numbers envisaged by the Travel & Industrial Development Association. The licensing laws require examination to see whether they are too strict, and if they deter hotel construction; the entertainment at places catering for tourists is often not good enough or else is too expensive; the publicity arrangements need to be intensified; above all, there needs to be an improvement in the food and wine provided. Persons in this country who go abroad have only to ask themselves why they go and how the attractions of this country would appeal to them as foreign tourists. Why was it that about 900,000 from this country visited France in 1929 (the peak year for the tourist business in the inter-war period), whereas only about 60,000 of the French came here? If the question is studied, it will be found that countries like France, Italy, Switzerland, and Canada set themselves out to cater for tourists, and we must follow their example. It needs a concerted effort on the part of all concerned, with central direction and assistance from the Government, to take advantage of the unique opportunity that will present itself after the war. Of course, the weather in Britain is a natural handicap, and we must intensify our efforts in other directions to counterbalance this.

It is not inappropriate, in conclusion, to quote the following passage from *The United States in the World Economy* recently published by H.M. Stationery Office: " Travel by residents of the United States in foreign countries has constituted one of the most prominent and, on occasion, spectacular features of the economic and social relations between this country and other countries and one of the most consequential items in the balance of payments. In a broad sense, foreign travel may be said to represent the most, and indeed the only, important luxury ' commodity ' this country ' imports ' from abroad." It is interesting to note that, in 1929, 384,000 Americans departed for Europe, South America, and the Far East; their expenditure amounted to nearly half of the total for all U.S. travel abroad. If after the war we can secure the bulk of these persons to Great Britain, we shall do well. Their expenditure of about £50,000,000 from this one source is not to be despised; it excludes fare payments and expenses on board other than U.S.A. vessels. The British railways are, of course, very greatly interested in tourist developments, and they have had considerable experience in developing it. No doubt they are giving serious attention to the memorandum of the Travel & Industrial Development Association. Some statistics are extracted therefrom on page 292.

* " Britain—Destination of Tourists? " Price 2s. Travel & Industrial Development Association of Great Britain & Ireland, 6, Arlington Street, London, S.W.1

Farming and Forestry Camps

TO provide assistance for the farmers during the busy summer months it has been the practice for several years to run farming camps at selected centres in agricultural areas. The periods during which the camps are open vary according to local circumstances; in localities where the work is mostly concerned with the corn harvest or potato lifting, the camps are open for August and September only, but in market-gardening districts it is not unusual for the camps to be opened in May and remain open until October. Young people from the towns and cities have found in these camps an ideal solution to the summer holiday problem, inasmuch as they are able to spend a week in the fresh air of the countryside, away from the noise and strain of war factories, and at the same time have the satisfaction of continuing their assistance to the war effort. The initiative in arranging the camps is usually taken by the County War Agricultural Executive Committees, which work in close co-operation with the railway companies.

The railways have given considerable assistance to the scheme by introducing cheap fare arrangements which have enabled the campers to undertake long journeys at a cost appreciably below

the normal fares. The basis of the reduced fares is one-half the single fare for the return journey in the case of passengers under 16 years of age and single fare for the return journey for persons 16 years of age and over. To meet the case of juveniles proceeding direct from school to camp and thence proceeding to their homes, point-to-point reduced fares are charged on the basis of one-quarter of the ordinary single fare under 16 years of age, and one-half the ordinary single fare 16 years and over. The concessions apply to third class travel only; travel is permitted on any day of the week. Certain concessions are also granted in the case of baggage, bicycles and camp equipment accompanying parties travelling under these arrangements. Similar facilities are also granted to passengers travelling to forestry camps under the Ministry of Supply home grown timber production department, and also to youths attending Ministry of Supply salvage camps. The popularity of the scheme increases from year to year, and the railways annually convey many thousands of young persons whose assistance is extremely valuable to the farmers.

Initiative and Progress in Switzerland

TWICE in a quarter of a century the Swiss have found themselves surrounded by countries at war, each one of them more powerful than they, and have seen the course of their economic life disturbed and their railway and other transport systems called on to adapt themselves to abnormal conditions. In these twenty-five years, too, the character of war has altered, and today the descent of foreign aircraft on Swiss soil has to be reckoned with, and even, as the *Swiss Federal Railways Magazine* has borne witness, the discharge, in error, of bombs, which have caused the loss of Swiss lives. Damage has been done to the Swiss railway system in this way. The experiences gained in the war of 1914-18 made a lasting impression, by which the Swiss, with their traditional good sense and initiative, were not slow to profit. Their high skill as engineers was used to advantage, and the work of electrifying the railways, decided on before 1914, pushed forward with energy. A reading of the reports which were drawn up by leading electrical engineers to form a basis for the Government's decision cannot fail to produce a realisation of the ability and care bestowed on the problem; and it is common knowledge in electric railway circles that the development of the single-phase traction system, which Switzerland selected as the most suitable for general adoption, owes a great deal to the work of Swiss engineers and industrial concerns.

Of several considerations which caused the decision to electrify, the chief was the wish to be independent of foreign coal supplies, a substitute for which was available in water power. The elimination of smoke and steam on routes abounding in heavy gradients and tunnels was almost equally attractive, particularly in view of the large amount of international and holiday traffic conveyed throughout the year. Much progress has been made in the design and equipment of the electrified routes. The single-phase system has been improved constantly; highly efficient locomotives have been built; and multiple-unit coaching stock, little in evidence originally, has found increasing application (the latest vehicles are of modern type in every detail). Improvements have not been confined to the Federal lines. The private railways have adopted the same progressive course, and during the last few years rolling stock of the highest class has been placed in service. In some cases, for example, where combined rack and adhesion working is required, the engineering details of the control and braking systems are of exceptional interest, as are methods employed to reduce weight. In various instances the system of traction, which is not uniform throughout the private lines, has been changed, where it would give through running and wider use of rolling stock; although possibly not called for normally, this might prove valuable in a national emergency. Electrification has been extended to some sections of line where traffic is relatively light, but has been welcomed by the local populations in the hope that it may herald a brighter economic future. Shortage of materials has obliged the railways to simplify some details of equipment, for instance, to employ wooden poles as contact-wire supports, and to use concrete more than hitherto.

The rebuilding of stations has proceeded as rapidly as possible and has involved many heavy works. The renewal of bridges, doubling of single-line sections and construction of connecting lines has been pushed forward commendably. Signalling, too, has made notable progress, although there is not the scope for such large works as exists in most other countries. The colour-light signal, including the mechanically-operated type, is being installed progressively as new work is undertaken, and there are some excellent examples of power signal boxes which incorporate the best features of modern practice. Remote control is being applied, and has considerable opportunities before it. The signal aspects, although apparently complicated to outsiders, have been adapted specially to local conditions and enable full advantage to be taken of the improved designs of points and the use of electric traction. Automatic train control has been applied to almost all the ordinary distant signals, and probably will be added to the inner distants, used to announce at home signals the indications given by starting signals. Where mechanical signalling remains there have been improvements in detail. Finally, much ingenuity has been expended on finding a substitute for track circuit on steel-sleepered way, of which there is a large mileage.

A Year's Traffic at Montreal

JUST over a year has passed since the Montreal Central Station of the Canadian National Railways was opened for public service on July 15, 1943, and some interesting particulars have recently become available regarding the heavy traffics which have been handled during the past 12 months. It may be recalled that this station, which was described and illustrated in *The Railway Gazette* of June 2, 9, and 16, 1944, has been provided by the effective use of a hillside site which has enabled a three-level station to afford excellent accommodation for heavy passenger traffics. Despite the fact that it is widely called a terminal, it is a through station, and British readers may be reminded that the word " terminal " is normally used in Canada to denote an important station, irrespective of whether it is a terminus in the physical sense. During its first year of service, this great Montreal Station (to which the name Bonaventure is to be transferred eventually), handled six-and-a-half million passengers, who travelled on the 35,040 trains which were operated in and out of the station in the 12 months. In addition, it is estimated that more than ten million persons have visited the station to see relatives and friends off, to meet them on arrival, or to get a first hand view of its many facilities. Since the formal opening day on July 14, 1943, when the Hon. Mr. J. E. Michaud, Minister of Transport, cut the ribbon, and Mr. Adhemar Raynault, Mayor of Montreal, unlocked the door, hundreds of sightseers have daily visited the station, which is said to have become an attraction on every sightseeing tour of the city.

The first train to leave the Central Station was a local to Sorel, Quebec, and the first train to arrive was a Detroit and Toronto express. The largest number of passengers using the station in one day during the past year was on the Friday before Dominion Day, when 27,448 travellers arrived or departed on C.N.R. trains. The Thursdays before Christmas and Easter ranked second and third in the number of passengers handled for a single day. During the first year of operation the Sleeping & Dining Car Department served approximately 100,000 meals to members of the Armed Forces *en route* through Montreal; 95,000 Service men and women availed themselves of the facilities provided in the Canadian Legion " Welcome Room "; and 362,014 pieces of luggage were handled in the parcels room. No fewer than 6,155 articles and $932.45, which had been lost by travellers, were handed in to the lost property bureau; most of these articles (and all the cash) were returned to owners.

Bonaventure Station has also handled a considerable volume of passenger traffic during the past year, particularly special Canadian National troop trains. By the use of this station, the Operating Department of the C.N.R. has been able to move these important trains with greater despatch and efficiency, even while handling traffic of record proportions. All suburban C.N.R. passenger trains to and from the Lakeshore and a Montreal—Brookville train also used Bonaventure Station. It may be recalled that the interior of Bonaventure was gutted by a serious fire on March 1, 1916. The structure was rebuilt in a modified form, but was intended to be withdrawn from service when the new Central Station was opened. In the special circumstances of the war, however, it is being retained to handle special war traffics, although it is still destined to be withdrawn from passenger service afterwards, and its name, which occupies no unimportant place in Montreal history, then transferred to the new Central Station.

DO NOT RELAX.—Recently, it has been said authoritatively that certain types of material no longer justify the cost in manpower of collection and rehabilitation. This is emphatically not the case with paper. Paper is still an essential munition. Old accumulations are largely exhausted, and dependence must be placed upon current salvage efforts.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

A Protest at Railway Propaganda

Worthing. September 14

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—I was rather surprised to see Mr. Bartram's letter in *The Railway Gazette* last week, which gave vent to his disapproval of the cover of a recent *Railway Magazine*.

He seems to take it as an advertisement against holiday travel, whereas I think it is just an illustration of a topical subject. Surely this is no more than the illustration on the front cover of the September-October number, of a Great Western Railway train intended to be an advertisement for the G.W.R.

Yours faithfully,
SOUTHERNER

Railway Electrification and Loose Coupled Freight Trains

20, Yewstock Crescent East,
Chippenham, Wilts. September 11

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Concerning the operating matters mentioned in "East Anglian's" letter in your issue of September 1, faster movement of loose coupled goods and mineral trains might be possible, but it would be extremely dangerous with existing brake power, that is unless extensive modifications to the signalling arrangements were made to provide increased braking distances. This latter would reduce rather than increase the capacity of the line. Also the acceleration capacity of electric locomotives would be of little advantage with such trains as the starts have in any case to be made very cautiously to pick up the loose couplings one by one.

In studying the results of electrification in other countries, and applying such results to British conditions, it is most important that the disadvantages of the loose-coupled goods train should be fully appreciated. It is perhaps significant that the one British railway that has embarked upon main-line electrification carries, in normal times, a relatively small goods traffic.

Passenger trains cannot be accelerated unless suitable paths can be arranged in the timetable. There is on record a case where a proposal to run one high-speed express passenger service over an already busy line had to be abandoned, because it was impossible to arrange a suitable path. The line was too much occupied with slow moving traffic, and to give adequate clearances for the proposed new "flyer" many new running loops would have been necessary. A mediocre timing for the new train had thus to be adopted.

As an extreme case of line-occupation by loose-coupled goods trains, there is in this country a section 4 miles long, over which the booked time, pass-to-pass, is 33 minutes. The reason for this excessive occupation is an incline 2¼ miles long graded at 1 in 75, at the top of which all loose-coupled goods trains have to stop to pin down hand brakes. Then comes a descent taking 15 minutes for the 2¼ miles, and then another stop at the foot of the incline to release the hand brakes. Just as long would be taken if the trains were hauled by electric locomotives.

The whole object of electrification would be to give improved operation, and better service to the community thereby; but so long as the unbraked goods and mineral train is with us, electrification, or for that matter any other widespread plan to improve train services will not stand a fair chance.

In your editorial article a continuance of present conditions in this respect seems to have been contemplated; if this was the case I feel that your view that there would be little difference in speed is amply justified!

Yours faithfully,
O. S. NOCK

Publications Received

Principles of Power Metallurgy. By Franz Skaupy. New York, U.S.A.: Philosophical Library, Inc., 15, East 40th Street. 9¼ in. × 6¼ in. 80 pp. Illustrated. Price $3 net.—A modern method of producing metal objects consists in changing metal powder into compact metal bodies by a process of caking or cohesion. Its first application, in all probability, was in the preparation of filaments for incandescent electric lamps, and concerned metals with a high melting point, such as tungsten, molybdenum, and wolframite. More recent applications have been in the production of extremely hard cutting-metals for tools. This small book covers the new field of metallurgy, which the author calls "Metal Ceramics," and which he considers in the future will form an increasingly important branch of metallurgy. The opening section deals with the production and properties of metal powders, and the second section with the production and properties of ceramic metal bodies, formed both without and with a binding agent. The concluding part of the book is devoted to a discussion of the ceramics of such elements as wolfram, molybdenum, and tantalum, and the practical applications of these and other hard metals.

Belgian Handbook. Compiled by Walter Ford. Published for the Belgian Information Office by Evans Brothers Ltd., Montague House, Russell Square, London, W.C.1. 7¼ in. × 4¾ in. 84 pp. Stiff paper covers.—In view of the early possibility of a Europe freed from German domination, there is a keen interest in the structure of the occupied countries, with which we hope to be able to resume trade relations. To meet such a need, the Information Office in London of the Belgian Ministry of Information has issued this useful and concise handbook of the political, industrial, and economic set-up of Belgium immediately before the German invasion. On political matters about which there may be differences of opinion, this is quite frankly a statement of the official Belgian attitude, and as such has a value far in excess of that of a nominally impartial survey which actually conceals a bias. Transport forms the subject of a section (by no means so comprehensive as we would wish), which points out that Belgium is the most densely populated, and in many senses the most highly industrialised, country in the world. Its main railways total more than 3,000 miles, or about 26 miles of railway to every 100 square miles of territory, against 23 in Great Britain. If the well-known Belgian light railway system be included, there are about 6,200 miles of line, or 53 miles to every 100 square miles of territory. However, the existence of these extensive light railways is offset by the fact that motor traffic is not so highly developed in Belgium as in England.

Modern Locomotives and Electric Traction of the Southern Railway. London: The Locomotive Publishing Co. Ltd., 88, Horseferry Road, Westminster, S.W.1. 8½ in. × 5½ in. 32 pp. and 16 pp. photographic plates. Price 1s. 6d.—The Southern Railway affords an example, unique in Great Britain, of steam and electric traction being developed side by side, for the company has vastly increased the efficiency of its steam-operated services since grouping, in addition to making very rapid progress with a policy of both suburban and main-line electrification. This little book is really a well-illustrated treatise on the motive-power policy and practice of the Southern Railway since its establishment 21 years ago as a merger of the L.S.W.R., L.B.S.C.R., and S.E. & C.R. The text begins by detailing the route-mileage and totals of locomotive stocks at the time of grouping, and then describes the policy of standardisation of steam engines, at the same time as electrification, adopted for the whole system. Not only are new locomotive types described, but the reasons for their introduction are given. Electric traction is dealt with similarly, and there are valuable lists of the dates of conversion of the various sections of line. Also, the reasons for electrification, and some indication of financial results are included. The booklet finishes with complete lists of the named locomotives of the Southern Railway.

Welding Data Sheet.—For the use of practical welders the Suffolk Iron Foundry (1920) Limited, Stowmarket, has issued a handy reference sheet of useful data on welding, gases, metals and flame temperatures. On one side a chart shows a ready comparison between Fahrenheit and Centigrade temperatures, the melting points of metals and alloys which includes the company's well-known "Sif" range, and an oxy-acetylene flame-colour diagram as an easy means of gauging temperatures and gas mixtures. The other side gives conversion tables and factors, the recommended electrode diameters and approximate consumption per foot run of welding for mild-steel sheets of metric and S.W.G. thicknesses, and the weight per 100 ft. of Sifsteel and Sifbronze welding wires in various diameters up to ¼ in. Supplies of this data sheet are limited, but a copy will be mailed by Suffolk Iron Foundry (1920) Limited on receipt of 2½d.

A Lion's Share!—This interesting and well-produced brochure has been issued by the Commercial Development Department of the Baltimore & Ohio Railway, to place before the American public an outline of the riches of resources, power, labour, markets and transport available in the "Heart of Industrial America"—the section so well served by the B. & O. The brochure contains many excellent half-tone illustrations, which show the many kinds of industry served by the railway and the haulage and handling facilities offered by the B. & O.

The Scrap Heap

THEY'RE COMING OVER

Since D-Day 190 special trains conveying prisoners of war have been run by the L.M.S.R.

* * *

SOCKS GO ON!

London Passenger Transport Board knitters have sent 96,229 pairs of socks to members of the staff serving with the Forces.

* * *

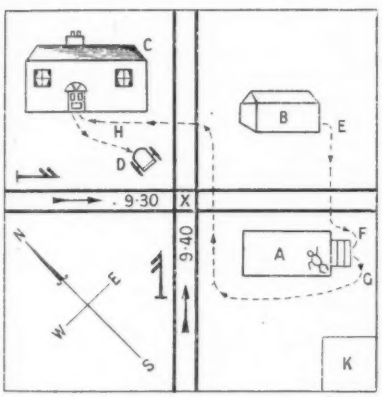
EMPIRIC RAILWAY PROBLEM

Mr. E. G. Garstang, District Goods Manager, Manchester, L.M.S.R., has sent the following problem: The accompanying sketch gives all the necessary data for its solution.

"X" represents in one of the more rural parts of the country, a point at which two single track lines cross at right angles.

A train is due to pass over "X" at 9.30 from a direction left to right and another is due to pass over at 9.40, both trains running normally dead on time.

The signalman from box "A" controlling these points has an allotment at "K," 27 yards from the steps of his box; and relying on the regularity of these trains is in the habit of pulling off



the separately worked signals and relying on the time interval for the safe negotiation of the crossing.

In "B" there is posted an A.R.P. worker with telephone communication to both stations from which the two trains come towards the crossing "X."

In the building "C" resides an old bed-ridden lady, who can only be moved about in a bath chair.

In the course of a conversation with the stationmaster from which the 9.30 proceeds, the A.R.P. worker learns that the 9.30 is exactly 10 minutes late, and in conversation with the other stationmaster, learns that the 9.40 is on time.

Making a rough calculation and noticing the signals off in both directions, he shouts across to the signalman in box "A" in the fear that he may have gone to his allotment "K."

The signalman, however, appears at the window, but on learning of the late running of the 9.30 falls down in a faint.

The A.R.P. worker then proceeds along the dotted line "E-F" into the cabin "A" and finds the signalman laid out. He knows nothing whatever of inter-box communication; he understands nothing about the levers, and in the circumstances what does he do?

The answer will be published next week.

The U.S.A. commemorative railway stamp described in our August 25 issue, page 184

* * *

Helpful Hints to Those Who Follow by Flats

GENERAL

Just a few words on how to take over a railway that you have never seen before and never wish to see again. Firstly, a knowledge of the language is essential. The words "burro," "Crosspel," "mush mush" and "nisht" comprise the language. There are a few other words, but only Iranians use them.

OPERATING

In order to persuade a train to leave a station it is necessary to carry out the following:—

1. Wake the Guard.
2. Send to town for the driver.
3. Reseal and check six unsealed wagons.
4. Uncouple and recouple all U.S. wagons.
5. Take three wagons off for GOM that were not advised for ARK.
6. Lure two engines off the Depôt.
7. Reblock all Oifits and Warflats.
8. Make out the wagon reports in three languages.
9. Sign for five missing invoices.
10. Throw fifty Iranians out of the brake cabooses.
11. Draw up for water.
12. Reverse the engines.
13. Change the washers on four brake hoses.
14. Wake the Guard again.
15. Kick the Guard.
16. Kick the Driver.
17. Kick the Pointsmen.
18. Kick the S.M.

CONTROL

The following instructions will be found useful when there are three trains at one station.

1. Tell the Station Master what you want done.
2. Do it yourself.
3. Put the fire out on the third train's engine and camouflage it as a dead engine. This deceives all concerned, who then think that there are only two trains, and, of course, everybody knows how to deal with two trains.

HOW TO CONTACT TRN CONTROL

1. Lift the receiver and place two rials on the table (for luck).
2. Ring TRN once.
3. Ring again several times and then once again.
4. Pause, to repair damaged ear drum —the result of offensive action from Nqwdej, Parandak and Shariar.
5. Get Kouh Pang to ring TRN Signals who go across to the Control and tell the Iranians to wake the English Controller (or the Scotch one) and hand him the receiver.

LOCO RUNNING

Here for future guidance we reproduce Loco Running Circular No. 999.

No engine shall leave any shed except under pressure from the Traffic Department and the following conditions must obtain:—

1. Both piston glands must be blowing. This reduces boiler pressure and saves the firebox. See my Tn/3?/£/%3/ / 12435.
2. One big end should knock and the crosshead should be removable. This tells the pointsmen that the engine is coming and is a great safety device.
3. All tender connections should blow. This conceals the train from the driver and gives him greater confidence.
4. Both gauge columns should be blanked off. This saves water.
5. The burner should be high as this gives much more satisfactory results in heating up tins of sausages, etc. See my Loco. Running Circular No. 000. Constipation on the Footplate.
6. The steam brake need not work. What is the reversing lever for anyway.
7. It is essential that the engine fails at Ghom, so that all necessary repairs may be done.

"Unless you're used to working at great heights I'm afraid you won't be much help"—by Neb

(From "The Daily Mail")

* * *

Miss Anne Crawford, actress, has a hobby which is, perhaps, an unusual one for a film star—model railways. Miss Crawford's father was in the service of the Palestine Railways.

* * *

TAILPIECE

(A complete field hospital for the U.S. Army has been dispatched by the Great Western Railway for shipment abroad)

Hats off, hats off to railway-men
Who work the transport lines!
They carry foodstuffs from the farms
And bring coal from the mines.

Their wartime record is supreme,
They've served the nation well,
And when the war is at an end
There'll be much more to tell.

But one consignment stands unique—
A hospital complete
Conveyed for shipment to a port,
A fine Great Western feat.

To mention more distinctive work
Would quite a problem raise,
And greater pens than mine, I trust,
Will give it well-earned praise.

W. E. N.

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

INDIA

New Alignments on N.W.R.

To remove that portion of the Karachi-Lahore main line of the North Western Railway from the flood danger zone, a new double-track alignment is in hand between Rohri, Mile 299, and Pans Akil, Mile 313. Eleven bridges of brick masonry with 15-ft. arches, and 45 lesser openings designed to pass flood water, are under construction. If the bridges are completed by then, track will be laid next November.

Another new alignment will shortly be in hand on the right bank of the River Indus. In 1942 the Sukkur-Begari Bund on the margin of the river was breached and the railway in Upper Sind was swept away in many places. Quetta was cut off for nearly four months. The most serious damage occurred between Bagarji and Ruk, where the single track ran close to the downstream side of the three canals which take off from the Lloyd Barrage at Sukkur and irrigate the land on the right bank of the river. The flood water, sweeping across country after having breached the Sukkur-Begari Bund, overtopped the canals and caused serious breaches of the railway. The breach at one point, it was estimated, was nearly 1,000 ft. long; the water was 34 ft. deep and was flowing at the rate of 11 ft. per sec.

New Single-Track Line

It had been decided to take the railway over a new alignment, away from the canals, but still on the downstream side; but in 1943 the right bank of the river below Sukkur had been eroded so far that the land over which the line was to be taken was swept away. Consequently, a proposal was accepted for the diversion of the line to an alignment at a distance of between 1 and 1¼ miles upstream of the canals.

The existing stations at Arain Road and Bagarji will be abandoned, and Ruk will cease to be a junction. The new line, of single track, will take off from the existing alignment from a point about two miles beyond Sukkur, and will run practically straight to rejoin at a new junction at Habibkot. The line, which will be about 17 miles long, will have three new stations, Arain Road (new), Gosarji and another yet to be named. The work began last May, and it is hoped that the line will be opened in midsummer, 1945. All bridges will be of masonry arches of 15-ft. span.

The existing line between Habibkot and Jamra is being raised over a length of about four miles.

UNITED STATES

Derailed by a Spike

A serious derailment on the Kansas City Southern Railroad, on April 6 last, as a result of which the locomotive, two cabooses and five bogie wagons were derailed out of a freight train of 72 bogie vehicles, is proved to have been due to a track spike having been left longitudinally on the head of one of the outer rails of a curve, with the hook upwards. This lifted the left wheel of the engine pony-truck sufficiently to cause the flange to clear the running surface, so that the wheel crossed the railhead on a 29-ch. curve, and derailment occurred; one employee was killed and two were injured. An extra gang had been working in the vicinity, and although the rules of the railway prescribed that all scrap material should be picked up, and two months had elapsed since the work was finished, this had not been done; this scrap spike was probably placed on the rail by a mischievous child.

Rebuilt Illinois Central Locomotives

The Illinois Central System is in course of rebuilding, in its Paducah shops, a number of the "2400" series of 4-8-2 locomotives; the reconstructed engines are being numbered in the "2300" series. Working pressure is being raised from 245 to 275 lb. per sq. in., which brings the rated tractive effort, at 85 per cent. of the working pressure, up to 69,800 lb. Two of the locomotives, Nos. 2301 and 2305, have been fitted experimentally with auxiliary 6 in. piston-valves, above the ordinary piston-valves; the purpose is to enable the cylinders to use the steam more expansively through a longer steam lap on the main piston-valve, and the auxiliary valves function at any cut-off above 40 per cent. The device is already in use on 2-8-2 freight locomotive No. 1501, and has given such satisfaction that its use is being extended. The rebuilt 4-8-2s also are fitted with a multiple-unit front-end regulator; this has six valves, and enables the steam-flow to the valve-chests to be better graduated, with less drop in pressure between the regulator and the piston-valves than is customary with a regulator of the type previously in use. Multiple-bearing slide-bars also are fitted. The rebuilt locomotives have cast steel frames at the front end, with cylinders and buffer-beams cast integrally. The coal capacity of the tenders has been increased to 22 tons by raising the side-sheets; the water capacity remains at 10,000 gal.

2-6-6-6 Locomotives for the Virginian

An inquiry has been made by the Virginian Railway, which concentrates mainly on coal haulage, for eight articulated steam locomotives of the 2-6-6-6 type. The design is presumably that of the neighbouring Chesapeake & Ohio Railway, which until now has been the only company to use a 6-wheel bogie for the support of the firebox end of an articulated chassis; and, if so, it is in accordance with the American wartime practice of reducing locomotive building to the minimum practicable number of individual types.

ARGENTINA

Railway Publicity

In continuation of the series of publications designed to enlighten the public on local railway problems, the Railway Publicity Office recently issued a pamphlet entitled "Present and Future of the Argentine Railways," which bears the name of Sir Montague Eddy on the front page, and which is being distributed free of charge among public libraries and other places in which it is likely to reach the attention of the Argentine public. The 36-page publication has received favourable comment in the local press.

In the preface, it is stated that the difficulties which the railways are facing are well known, and that those which are financial started as far back as the 1930-31 crisis and since have become worse. Sir Montague Eddy's speech at the luncheon held by the British Chamber of Commerce in Buenos Aires last October for the mission of directors of British-owned railway companies, which was devoted to a review of the Argentine railway situation and of the problems confronting the undertaking, is reproduced in full; and the opportunity has been taken of enlarging on the various points which he made. Respecting the capital accounts of the broad-gauge and Entre Rios and Argentine North Eastern Railways, a comparison is made of the figures recognised by the National Railway Board with the share and loan capital of the companies concerned, as shown hereunder:—

	Recognised by National Railway Board*	Share and loan capital†	Difference
	(millions of pesos)		(per cent.)
B.A.G.S.R. ...	898	945	+ 5·2
C.A.R. ...	746	819	+ 9·8
B.A.P.R. ...	503	571	+ 13·5
B.A.W.R. ...	337	361	+ 7·1
E.R.R. ...	84	96	+ 14·3
A.N.E.R. ...	90‡	72	— 20·0
Total ...	2,658	2,864	+ 7·7

* at June 30, 1940; † at June 30, 1942; ‡ estimated by the National Railway Board, as capital has not been studied.

The foregoing comparison is particularly timely, as one of the points of the petition of the Union Ferroviaria of March 20 was the demand for the intervention of the National Railway Board "due to its dilatory action in the matter of ascertaining exactly the real capital account of the railway companies" (see the May 19 and July 21 issues of *The Railway Gazette*).

Another interesting table is that showing the 3 per cent. contribution of the railway companies in respect of the Mitre Law single tax, which is shown year by year, from 1908 to June, 1943; the respective amounts are: B.A.G.S.R., 31,433,285 pesos; C.A.R., 29,736,284 pesos; B.A.P.R., 20,571,512 pesos; B.A.W.R., 12,058,522 pesos; E.R.R., 2,151,357 pesos; and A.N.E.R., 1,330,174 pesos (total, 97,281,134 pesos).

Government Traffic Rebates

An interesting but not widely-known factor is dealt with on page 34 of the pamphlet which refers to the rebates accorded by the railway companies on National Government traffic, both passenger and goods. The figures given cover the period from July, 1908, to June, 1943. Comparison is made of the public tariffs with the amounts actually paid by the Government, which has benefited as follows: B.A.G.S.R., 98,978,877 pesos; C.A.R., 60,511,356 pesos; B.A.P.R., 23,320,204 pesos; B.A.W.R., 11,326,534 pesos; E.R.R., 9,720,365 pesos; and A.N.E.R., 5,523,711 pesos (total 209,381,047 pesos).

SWEDEN

Railway Financial Results

The latest monthly report issued by the Swedish State Railways indicates that last April takings amounted to kr. 44,600,000, compared with kr. 43,200,000 in April, 1943; whereas expenditure rose slightly to kr. 32,300,000 from kr. 31,900,000. The total takings for the period January-April inclusive amounted to kr. 170,500,000, compared with kr. 163,800,000 for the first four months of 1943; and expenditure was kr. 126,600,000 (kr. 122,200,000). After interest service, the net profit for January-April amounted to kr. 29,300,000, compared with kr. 28,200,000 for the same period of 1943.

The most recent report for private railway companies refers to March. Combined takings for that month were the same as in March, 1943, that is to say, kr. 13,400,000; but the profit amounted only to kr. 1,400,000, compared with kr. 2,000,000 in March, 1943. Combined takings of private railway companies for January-March, inclusive, were kr. 37,300,000 (the same figure as in 1943), and the net profit was kr. 3,200,000 (kr. 4,200,000).

How Long Can a Rail Be?

Continuous welding of rails in the open in the United States has been carried to lengths up to 6,983 ft., and is practised by five railways

A PERMANENT way development which is likely to see a considerable increase is the continuously-welded rail. Every addition to rail length is of advantage in reducing the number of rail-joints, which are the most troublesome and costly part of the track to maintain, but in Great Britain hitherto, welding has been confined chiefly to the welding of standard 60-ft. rails into 120-ft. and 180-ft. lengths, and of 39-ft. rails, imported from America, into 78-ft. and 117-ft. lengths. In the United States, however, where the first experiments in continuous welding were made as early as 1930 in tunnels, and 1932 in the open, not only is twelve to fourteen years' experience thus available, but the total of continuously-welded track now amounts to about 90 miles, in lengths ranging from 2,640 ft. to 6,983 ft. Of the 90 miles, roughly one-third is in tunnels, or along paved streets in which the webs and feet of the rails are buried, so that the temperature variation factor has little influence; but the remaining 60 miles is entirely in the open.

The railways concerned are the Bessemer & Lake Erie; Central of Georgia; Delaware & Hudson; New York, New Haven & Hartford; and Southern; and their experience, with welded rails that have been in service more than five years, was summarised in the February 12 issue of our American contemporary, the *Railway Age*. The welded rails are laid both in straight tracks and on curves in sharpness up to 15 chains radius. Rail sections thus welded range from 100 lb. to 131 lb. per yd. in weight, in all cases, of course, flat-bottom. Ballast includes broken limestone and trap rock, furnace slag, sand, and cinders; and in one continuously-welded stretch, four rails, all 800 ft. long, are laid on a trestle viaduct. Some of the lines concerned are used by 20 passenger and 20 freight trains daily; another section carries 57 passenger and 4 freight trains each day; on others the traffic is lighter, and in at least one case varies considerably according to the season of the year. It is estimated that traffic ranging from 25 to 160 million gross tons has passed over the various continuously-welded tracks under review. The gradients on the test lengths vary from level to 1 in 76; some of them are single lines, and others carry the traffic on both rising and falling grades. Every possible variation in track and traffic conditions is thus present.

The point of greatest interest in these tests is obviously the reaction of continuously-welded rails to the normal tendency to expand or contract under the influence of temperature changes. If expansion were unrestrained, a rail one mile long would normally increase in length by 41 in. with a rise in temperature of 100° F. In answering a questionnaire on the subject, four of the railways concerned give the variation of temperature to which their long rails are subjected through the year as −10° to 110°, −15° to 115°, −30° to 120°, and 15° to 120°, or a total range of 120°, 130°, 150°, and 105° F. respectively. This being so, the total expansion of a rail one mile long, in such conditions, should not be less than 40 in. and might exceed 60 in. Moreover, it is well known that rail exposed to the summer sun may reach a temperature considerably greater than that of the surrounding atmospheric temperature, which further complicates the problem.

The five railways concerned, however, all report that they are experiencing no difficulty through movement of the rails, either at the ends or intermediately; the end movement is no greater than that with standard 39-ft. rails. Two lines have made no change in their normal track construction — double-shoulder sleeper-plates with cut spikes—except that extra anchorage is applied to the rails, at the ends, by means of anti-creepers. Originally, the Central of Georgia took no special precautions to prevent movement, but later applied six anti-creepers to each welded rail for a distance of 250 ft. from each end, placing the anti-creepers in the autumn in a position to resist contraction, and reversing them in the spring to resist expansion. Later still, the number of anti-creepers was increased to twelve per rail. The New York, New Haven & Hartford uses compression clips for fastening welded rail, but as a precautionary measure has applied one-third more of these than would be used normally. The Delaware & Hudson has employed M. & L. sleeper-plates on all its welded rail, and the Bessemer & Lake Erie has laid its welded rail with G.E.O. fastenings.

It has been shown in the *Proceedings of the American Railway Engineering Association* (Vol. 38, p. 493), that if sufficient restraint be applied to a rail to prevent movement, an internal stress is created of 195 lb. per sq. in. for every 1° of change in temperature. A change of 100° would thus exert a stress of 19,500 lb. (8¾ tons) per sq. in. This stress will be exerted only at temperatures above or below that at which the rail was laid, and if the latter is between 50° or 60° F., the maximum stress, as has been proved in practice, can be considerably reduced, as the most extreme variation of temperature above or below the laying temperature can thus be kept down to between 65° and 75°. The only one case of buckling track reported by the five railways was on a length of line that was relaid with welded rail at a relatively low temperature; the trouble was overcome by loosening the fastenings, on a day of average temperature, and allowing the rail to expand past an open joint, after which the excess length was cropped, and no further trouble was experienced.

Even a variation of 65° or 75° from the laying temperature would prove extremely troublesome, however, were it not that restraint on expansion and contraction is being applied to the rails throughout their length. A considerable part of this restraint is applied by the friction between the rail-foot and the sleeper-plate, and this can be augmented by the use of such fastenings as the spring clip, which increase the pressure of the rail on the tie-plate. Additional restraint can be applied by means of anti-creepers, and considerable restraint is provided by the joint construction at the end of a long rail. Ultimately, however, the restraint applied to the rail must come through resistance applied by the ballast to broadside movement of the sleepers.

These various restraints have been measured with a fair degree of accuracy. With double-shoulder sleeper-plates and cut spikes the restraint can be as low as 20 lb. per tie, but can rise as high as 700 lb. with spring-clip fastenings. Anti-creepers exert a restraint up to 850 lb. Joint restraint may be as much as 5,000 lb. per every square inch of section of a 131 lb. rail, and approximately 65,000 lb. at each end of the welded rail. Assuming a maximum temperature variation of 75° F., the maximum total stress in a 131 lb. rail is about 188,000 lb. (84 tons) in either compression or tension. If the joint restraint is, say, 65,000 lb., and the frictional restraint of rails on sleeper-plates averages 500 lb. at each sleeper, complete anchorage of the rail on 260 sleepers at each end of the welded rail should be sufficient to prevent movement. On the other hand, if reliance is placed only on anti-creepers, 220 of these along the welded rail should be sufficient to hold a rail of any length against movement.

The questionnaire sought information from the five railways using long welded rails as to whether they had experienced any difficulties, to which two of the lines replied that they had neither had any difficulties nor knew of any disadvantages attaching to continuous welding. Two companies had had failures of welded joints, but attributed these either to faulty welding technique or materials in some of their earlier welding experiments, which in later installations had been corrected. In a few cases fishbolts have sheared, but these failures were regarded as arising from inaccurate drilling of bolt-holes, with the result that when the rail contracted, the entire stress came on to a single bolt. At the joints concerned the rails were re-drilled, and 6-bolt fishplates applied in place of the previous 4-bolt plates. Generally, the expansion and contraction at the ends of the long rails have been less than the clearance of the fishbolts in their holes. Nothing is said in the report as to the procedure followed if defects, such as transverse fissures, develop in the long rails; it is difficult to imagine that no such casualties have occurred. Presumably the affected lengths are cut out, and substitute lengths either fished to the adjacent rail, or, when opportunity offers, welded into it to restore the continuity, though such work is by no means easy if it has to be conducted in a line carrying heavy traffic. Further, the substitute rail must be of roughly the same section as the worn rail to which it is welded.

As to the advantage of continuous welding, one line estimates that it has reduced the cost of maintenance by 25 per cent. Another reports that since the rail was laid, six years ago, maintenance has been confined to a limited amount of spot surfacing and an occasional tapping down of the spikes. A third line is making a detailed comparison between the costs of maintaining two lengths of track, one laid with welded and the other with non-welded rails, and already an appreciable reduction is showing in favour of the welded rails, but the comparison is not regarded as having proceeded sufficiently far to date to be conclusive. Four of the five railways consider that it is easier to maintain line and gauge with the welded track, while the fifth has not experienced any marked difference between the two in this respect. It is the general opinion, not only that the welded track gives smoother riding, as might be expected, but also that it is easier to maintain it in smooth-riding condition than ordinary jointed track.

XUM

There is also less destruction of sleepers where continuously-welded rail is in use.

It is the considered opinion of the maintenance engineers of all five railways that the welded rails will give longer service than standard 39 ft. rails; the reason is that end batter and joint wear are primarily responsible for shortening the life of ordinary rails, and that neither occur in the welded rail except at the extreme ends. It should thus be possible to leave welded rail in the road, on straight tracks, until it becomes necessary to replace it for other reasons. On curves, however, wear of the rail-head is the controlling factor, and in this respect the welded rail offers no advantage over the non-welded rail.

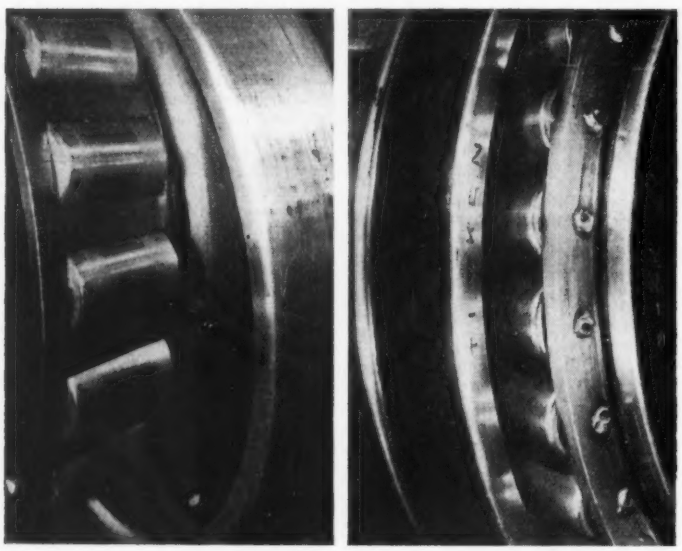
Experience is as yet too limited to enable a decision to be reached as the maximum practical limit to be set to the length of a welded rail, but three of the American lines concerned express the opinion that the only limitation will be the necessity for introducing insulated joints in connection with track circuits, or the laying in of crossovers, turnouts, or railway level crossings. One chief engineer regarded the problem as being not so much the maximum length that is practical as the minimum length that is economical.

There is general agreement that the welding of rails into long continuous lengths is an entirely practical proposition, and that the principal deterrents are the initial cost, the difficulty of making a replacement in the event of a defect developing, and the difficulty of mobilising the equipment for handling very long rails. In this connection, rails in lengths up to 1,500 ft. have shown themselves sufficiently flexible to prevent any lateral movement on the wagons or other difficulties when moving round curves as sharp as 6 chains radius.

Summarising the collective views of those responsible for installing and maintaining the present installations of continuously welded rail in the United States, it is clear that no fears need arise as to the possible effects of expansion and contraction. It is equally clear that there are appreciable savings in the costs of maintenance as compared with standard jointed track. There are good prospects of longer rail life, which should result in less frequent renewal. The life of sleepers is increased, because destructive action on the part of the rails is reduced. Track circuits give less trouble, and can be lengthened, as bonding is done away with. Rolling stock rides more quietly and smoothly, and this should have a beneficial effect also on the maintenance of rolling stock.

Tapered Roller Bearings on the L.M.S.R. Turbomotive

Absence of wear after 250,000 *miles service*



Leading bogie and main driving axle bearing after 250,000 *miles service*

THE turbine-driven 4-6-2 express locomotive, No. 6202, which was designed in 1935 by Sir William Stanier, who retired recently from the position of Chief Mechanical Engineer of the L.M.S.R., has completed 250,000 miles in operation. This was the first locomotive in Great Britain to be equipped throughout with roller bearing axleboxes, and attention was given recently to the gear drive, when the opportunity was taken to examine the Timken tapered roller bearings with which all the axleboxes are fitted. By the courtesy of Mr. C. E. Fairburn, Chief Mechanical & Electrical Engineer of the L.M.S.R., and of British Timken Limited, the accompaning details and illustrations are given. The condition of the bearings has justified Sir William Stanier's decision to mount all axles on anti-friction bearings. All bearings were found to be in perfect condition. The leading bogie axles are carried in a split cast-steel cannon box and the accompanying illustration of the dismantled bearing shows the absence of wear of the rollers. The double-row bearing in each of the driving-axle boxes is as good as when first installed. A point of special interest about this axle is the ratio of the resultant to the static loads on the bearings; this is approximately 7 to 1. The static load was 22,700 lb. per journal, but the actual resultant load due to dynamic augment attained 144,000 lb.

The coupled axles also are carried in cannon boxes, incorporating a single-row bearing of 19 in. outside diameter at each end, and the high polish attained by the rollers indicates their first-class condition. The Bissel-type trailing-truck axle is carried in two single boxes, each of which contains two single-row bearings. These roller bearings show the same satisfactory condition.

This locomotive was an experiment and one result expected was greater availability than was obtainable with the reciprocating type. The anti-friction bearings have given no trouble in service and any loss of availability due to heated bearings has been avoided.

Mr. E. S. Cox, M.I.Mech.E., M.I.Loco.E., Chief Technical Assistant, Chief Mechanical & Electrical Engineer's Department, L.M.S.R., in his recent paper, "Locomotive Axleboxes," a summary of which was published in our April 28 issue, commenting on the increasing use in the U.S.A. of roller-bearing axleboxes, stated, "There is little first-hand information applicable to British practice." The experience gained in the further operation of this turbine-driven locomotive will go far towards providing information for British railway locomotive designers.

New locomotive construction in the U.S.A. almost invariably includes roller-bearing axleboxes; the most recent examples are the Pennsylvania Railroad's two 4-4-4-4 type locomotives, "T1" class, which haul passenger trains of 880 United States tons at 100 m.p.h. on level track. Timken axleboxes are fitted to all the axles of the engine and tender.

SPECIFICATION FOR STEEL EYEBOLTS.—The British Standards Institution has issued B.S.S. No. 529—1944 for Steel Eyebolts: Part 1—with Collars; Part 2—without Collars for Lift Suspension. Part 1 is a reprint of the 1934 edition and deals with eyebolts with collars having short screw tails $\frac{3}{8}$ in. to 3 in. in dia. The eyebolts are designed to be used with shackles to B.S. 825, and for vertical lifting are rated for working loads 5 cwt. to 30 tons; for inclined loading in pairs appropriate reductions in working load due to sling angularity are tabulated. Correct and incorrect methods of slinging are shown in an appendix. Part 2 is new and deals with eyebolts without collars; with elongated eyes and long screw tails $\frac{3}{8}$ in. to $1\frac{1}{8}$ in. in dia. fitted with double nuts. The eyes of the eyebolts are designed to accept wire rope thimbles to B.S. 464 for specific sizes of wire ropes. The eyebolts without collars dealt with in Part 2 are unsuitable for inclined loading; and it is pointed out that an obliquity of $2\frac{1}{2}$ deg. reduces their strength by 28 per cent., and that an obliquity of 5 deg. reduces their strength by more than 50 per cent. Copies of the specification may be obtained from the British Standards Institution, 28, Victoria Street, London, S.W.1, price 2s.

Electric Traction Section

Wirral Lines Electrification, L.M.S.R.—I

*Extracts from Mr. C. E. Fairburn's paper before the Railway Engineering Division of the Institution of Civil Engineers**

THE Mersey Railway was worked by steam locomotives until 1903 when it was converted to electric traction using direct current at 650 volts and the third and fourth rail system. An important reason for the change was the need for overcoming the atmospheric pollution caused by the steam locomotives in the long tunnel under the Mersey. Electric services on the Wirral Railway were inaugurated on March 14, 1938. Joint services to and from Liverpool are now operated by the two companies; advantage has been taken of the change to improve the services generally and also the station amenities.

There are no serious gradients on the Wirral lines, but in the Mersey Tunnel there is a gradient nearly half a mile in length, some parts of which are 1 in 30, and 400 ft. of which are 1 in 27. The general operating conditions on the lines could have been met, and an economic performance obtained, with motor-cars equipped with two motors only, but an additional factor was introduced by the gradient of 1 in 27 in the tunnel approach. It was decided that 4 motors per motor-coach were necessary to ensure that if a three-car set failed in the tunnel, a duplicate set would have sufficient adhesion to draw it out. The factor of adhesion under normal conditions is therefore good, and a second, higher, setting of the current-limiting relays can be brought into use under emergency conditions by operating a sealed button in the driver's cab.

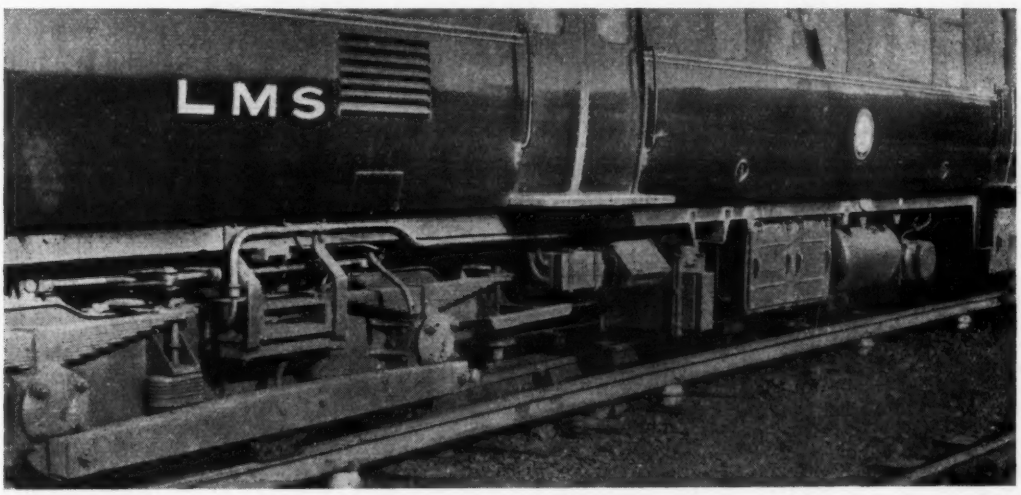
The Wirral stock, on a relatively easy service, accelerates at 1·4 m.p.h. per sec. and brakes at 2 m.p.h. per sec. The motors are rated at 135 h.p. for 1 hour and 95 h.p. continuously. They are of the usual cast-steel box-frame type with roller-armature bearings and sleeve-suspension bearings. The gears and pinions are of case-hardened low-carbon steel and the ratio is 63 to 16. The total weight, including gears and gear-cases, is 4,125 lb., and the maximum safe operating speed is 60 m.p.h. The motors are self-ventilated, with fans at the commutator end of the armature so that dust from the brushes is not blown on to the motor winding; to reduce the quantity of dirt and dust drawn in from outside, the ventilating air is taken through sliding bellows connections and ducts from openings in the sides of the coaches well above track-level. One of these openings can be seen in the accompanying illustration.

Electro-pneumatic individual contactor-type control equipment was chosen, and the components are arranged in four groups, each contained in a removable dust-tight steel box suspended from the underframe. To facilitate repairs, and to reduce the time a defective coach is out of service, complete interchangeable spare units are available at the repair shop. The equipment-boxes are arranged for easy removal or replacement by the use of a lifting truck. The boxes have lips on each side, which engage in slides attached to the coach underframe; all the connections to the components in the box are made at points readily accessible when the front and back covers are removed. These specially designed readily demountable equipment cases can be seen in the illustration already mentioned. Although each motor-coach has four motors, the control equipment is not duplicated; the motors are connected in two groups, each in permanent parallel.

The usual practice of running bus lines and cables in conduit between items of equipment was followed, but as a trial on one motor-car, thin-gauge copper conduit with soldered unions was substituted for the heavy-gauge steel conduit with screwed unions normally used. This saved 375 lb. of weight on the three coaches and the greater cost of the material was approximately balanced by the saving in erection cost with the more easily handled copper. Further, it is expected that, because of the absence of rusting of the copper conduit, some saving in maintenance cost will be effected. So far, the experiment has proved well justified and, in later stock built for another of the company's electrified lines, copper has been adopted more extensively for conduit and has also been tried for air piping, where it has the additional advantage, especially when the stock first goes into service, that there is no danger of loose scale or rust getting into the brake or control equipment valves. It is also easier to make the equipment air-tight when first assembled.

On the Wirral line trains, provision is made for cutting out a pair of defective motors on any motor-coach by means of a manually operated switch. In addition, on a six-car train, the equipment on either motor-coach can be completely cut out by means of push buttons in the driver's cab; these operate nine-point control cut-out relays in each equipment. This is a valuable feature in stock which has to operate underground, as a six-car train could continue running even in the event of a serious failure and it is unnecessary for the driver to leave his cab to isolate the defective equipment. It is believed that this is the first time that such an arrangement has been used.

In deciding the electrification system to be used, account had to be taken of the existing current-supply equipment and rolling stock of the Mersey Railway which had not reached the end of their service lives. If there had been complete freedom of choice, the 1,500-volt overhead system almost certainly would have been used, but, in the circumstances, it was decided to adopt the same current supply as on the Mersey Railway. However, a considerable saving was achieved by using the running rails as the return circuit instead of installing a fourth rail, as on the Mersey lines. This involved change-over equipment on the stock of both companies, but the apparatus needed was



Side of motor coach showing louvred openings for motor ventilation and control equipment, all items of which are readily demountable as complete units

* A very brief summary of this paper was given in our issue for November 12, 1943, page 482. This dealt with the operating results; these are therefore omitted in the summary above

simple and the cost was negligible in comparison with the cost of installing a fourth rail. It is believed that this, too, is the first instance where such an arrangement has been adopted and a brief description follows.

The change from third rail to third and fourth rail running occurs at Birkenhead Park. Here the connection which earths the equipment on the motor-coach must be broken; otherwise, some current would return through the running rails and disturb the track-circuit signalling arrangements on the Mersey Railway. This is effected by opening the earthing contactor; the connections to the negative shoes are permanent. The contactor is closed pneumatically and is mechanically latched in. It may be opened or closed by the operation of push-buttons in the driver's cab; the "close" button is used when passing from the Mersey Railway to the Wirral lines, but the change is effected automatically when passing in the opposite direction. If, in going from the Mersey Railway to the Wirral lines, the driver should forget to push the button, the result is merely that the train loses power, but if the necessary change did not occur when the train was travelling in the opposite direction, the services might be dislocated; as an extra precaution, to check the operation of the automatic gear, the driver is instructed to press the "open" button when standing in Birkenhead Park Station. The automatic equipment is operated by means of large, permanent magnets placed between the running rails, which cause the momentary closing of a magnetic relay mounted under each motor-coach. This relay completes the earthing-contactor trip circuit. The positions of the magnet may be seen from the accompanying diagram, which shows also the track arrangements and electrical connections at Birkenhead Park. There are magnets in the track approaching the station in both directions, but those on the Mersey Railway side are provided for the Mersey Railway stock only, on which the changeover arrangements are different. The conductor rails in the station area are separated from those of the approaching tracks by a number of gaps approximately 50 ft. long. These sections at the stations are fed from the approaching tracks through switch-gear mounted in two kiosks on the ends of one station platform and, although each section may be fed from either company's system, key interlocks are provided to prevent both supplies being made to the same section, which would have the undesirable effect of paralleling the two supplies. For simplicity only, the positive connections are shown; the negative connections are made by duplicate switches and cables, but there are no circuit-breakers. Normally, platforms Nos. 1 and 2 and the up sidings are supplied from the Mersey system; the other platforms and the down sidings are supplied from the Wirral lines. All the tracks have a negative conductor rail; when a track is supplied from the Mersey Railway, this rail is connected to the fourth rail of that system, whereas when a track is supplied from the Wirral lines it is connected to the running rails and trains can move on the line whether the earthing contactor on the stock is open or closed. As trains pass over the 50-ft. gaps, the two current supply systems are momentarily paralleled through the train bus lines, and to limit the current which may circulate between the systems two 0·2-ohm traction-type resistances are introduced across a gap on either positive conductor rail approaching the station at a distance of just over a train length away; these resistances are shown in the diagram. A minor point of interest is the provision on the stock of a small manually-operated switch with a pull-off switch so that it must be held closed; this makes a connection across the earthing contactor, and is necessary because it may happen that stabled stock is standing on the third-rail system without compressed air and with the earthing contactor open. Without this switch it would be impossible to run the compressor to obtain an air supply to close the earthing contactor and the stock would be rendered immobile.

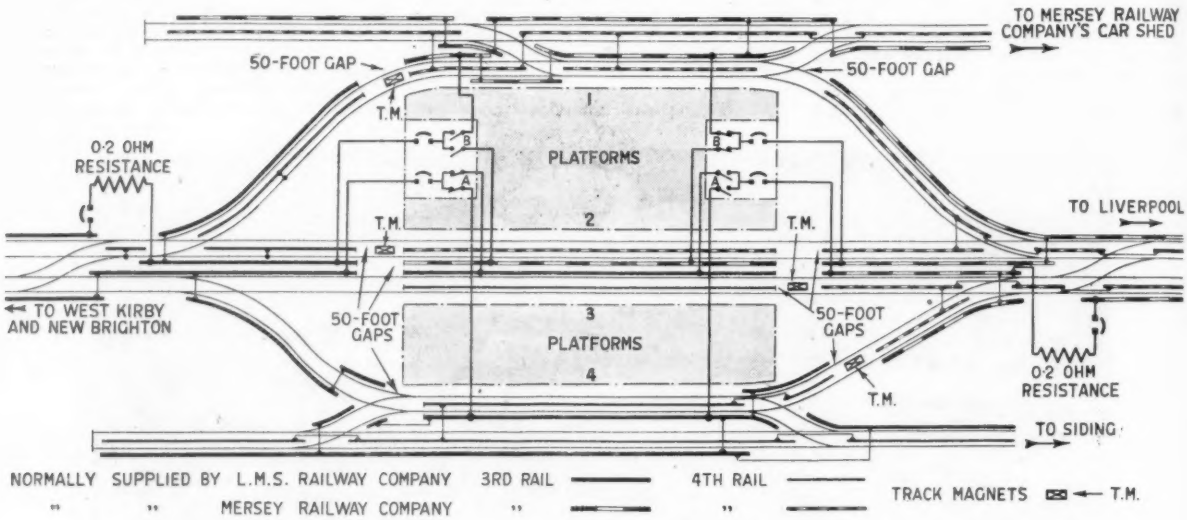


Diagram showing layout of Birkenhead Park Station

(To be continued)

ELECTRIC TRACTION IN COPPER MINES.—An interesting portable overhead contact system for electric locomotives operating in districts where the strip mining of copper is carried out is described in our American contemporary, the *Railway Age*. Electric locomotives for long have been popular in the strip mining of copper, where their characteristics are peculiarly advantageous. Both ore and waste require handling; usually the former is conveyed over permanent tracks with permanent overhead distribution systems, and for transporting the waste a portable system has great attractions, as the track has to be moved at frequent intervals. To allow plenty of clearance for loading the waste, therefore, the trolley wire is offset from 10 to 16 ft. from the centre of the track, on the side remote from the loading shovels. The portable structures supporting the trolley wire are usually steel, either of fabricated shapes or of pipe. A wood support has been found to have too short a life, and moreover it splinters easily with the constant handling. A typical structure consists of a 5-in. pipe embedded in a concrete footing, and having at its top a bracket supporting the wire. A large eyebolt on the concrete is used for pulling it into position; or it can be pushed into place by a bulldozer. A special trolley-wire clamp is used, having the usual jaws for gripping the grooved wire, and in addition, an opening above the jaws in which the wire can be supported but not clamped. This device allows the trolley wire to slide freely through the jaws while the poles are being moved to new positions.

RAILWAY NEWS SECTION

PERSONAL

Mr. A. M. Sims, Chief Engineer, North Western Railway, India, recently officiated as General Manager of that railway, during the absence on leave of Sir Arthur Griffin (who since, as recorded in our September 8 issue, has succeeded Sir Leonard Wilson as Chief Commissioner of Railways).

Mr. J. E. S. Bodger, Engineer, Way & Works (Acting Deputy General Manager), Ceylon Government Railway, has been appointed Deputy General Manager. Mr. J. L. Sanders, Deputy Engineer, Way & Works (Acting Engineer, Way & Works), has been appointed Engineer, Way & Works.

Commander Sir Charles Craven has joined the boards of the Sun Insurance Office Limited and the Sun Life Assurance Society. Sir Charles Craven is Chairman & Managing Director of Vickers-Armstrongs Limited, Chairman of Gresham & Craven Limited, and Deputy-Chairman of Vickers Limited.

M. René Mayer is the Minister of Transport in the new French Provisional Government. He formerly held positions as a member of the Council of Administration, French National Railways; a Director (and President of the Committee of General Management) of the International Sleeping Car Company; and a member of the Paris board of the Madrid, Zaragoza & Alicante Railway Company.

The President of Brazil has appointed Senhor Arthur Pereira de Castilho as Chief of the National Railway Department.

We regret to record the death on June 26 of Mr. W. J. Hogan, General Manager of the Grand Trunk Western Railroad, U.S.A. (a subsidiary of Canadian National Railways).

Mr. C. A. Skog, formerly Freight Traffic Manager, Grand Trunk Western Railroad, has succeeded Mr. Hogan as General Manager. Mr. J. V. Maloney has been appointed Freight Traffic Manager.

Mr. Ernest Evans, Staff Superintendent (Railways), L.P.T.B., retired from the Board's service on September 16.

Mr. R. C. Turner has been appointed Manager of the Service Sales Division of British Timken Limited.

Mr. Gerard Swope has resigned the Presidency of the General Electric Company (of Schenectady). Mr. C. E. Wilson, who resigned on his appointment, in 1942, to the War Production Board (of which he was Vice-Chairman, has been re-elected President, and a Director, of the G.E.C. Mr. O. D. Young has resigned his position as Chairman of that company, which he took over when Mr. P. D. Reed proceeded on Government service. Mr. Swope and Mr. Young previously had retired.

Mr. T. J. D. Atkinson, K.C., O.B.E., M.A., whose retirement because of ill-health from the office of Registrar to the Railway Rates Tribunal was briefly announced in *The Railway Gazette* of September 8, was the first holder of that position, which he had occupied since January 1, 1922. He was educated at Trinity College, Dublin, where he was Medallist in Legal Science, was called to the Irish Bar in 1904, and took silk in 1924. In the last war he was a Captain in the 5th Battalion of the Royal Irish Fusiliers, 10th (Irish) Division, 1914; a Staff Captain, 31st Infantry Brigade, 1915; and was severely wounded at Suvla Bay, Gallipoli, in August, 1915. In 1917-1919 he was Staff Captain, General Headquarters (Ireland). His work at the Railway Rates Tribunal is dealt with in some detail in an editorial article in this week's issue (page 275). He brought out the Rules of Procedure under the Railways Act, 1921. The interlocutory proceedings during the transitory period up to the Appointed Day on January 1, 1928, were long and complicated. In the intervals between the 116 sittings of the tribunal which were concerned with the fixation of the Standard Revenue, Mr. Atkinson frequently acted as informal chairman at meetings between representatives of the railways and traders. He also drafted all the Orders of the Tribunal. Additional work was thrown upon him in connection with the Freight Rebates Scheme under the Local Government Act, 1929, and with "Agreed Charges" under the Road and Rail Traffic Act, 1933. He also originated the simplified procedure under which exceptional rates, classification matters, rebates, and agreed charges are dealt with. Mr. Atkinson is the author, jointly with Mr. L. R. Lipsett, of "The Law of Carriage by Railway in Great Britain & Ireland," which was published in 1928.

Mr. T. J. D. Atkinson
Registrar, Railway Rates Tribunal, 1922-44

Mr. Jacques Abady, K.C., has been appointed Deputy-Registrar to the Railway Rates Tribunal.

The Government of Northern Ireland has accepted the resignation of Mr. D. L. Clarke, Chairman of the Northern Ireland Road Transport Board, which he has tendered on medical advice.

We regret to record the death on September 3, at the age of 81, of Mr. Thomas Bolter, formerly for many years Director & Secretary of the Santa Marta Railway Co. Ltd., Colombia (now known as the Magdalena Railway).

Mr. F. R. Stagg, M.I.Struct.E., Assistant Managing Director of Thos. W. Ward Limited since 1938, has been appointed a Joint Managing Director. Mr. H. W. Secker, who has been a Director of the company since 1938, has been appointed an Assistant Managing Director.

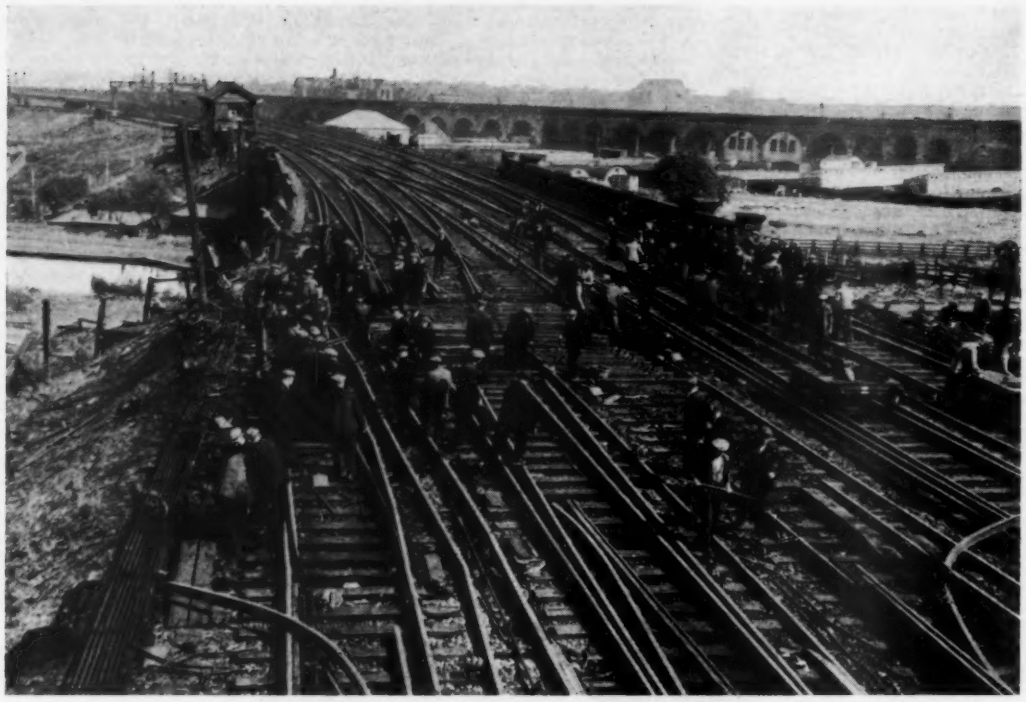
We regret to record the death at Albany, New York, at the age of 81, of Mr. W. H. Elliott, one of the most prominent signal engineers in the U.S.A., who retired from the position of Signal Engineer, New York Central Railroad, in 1933. Mr. Elliott began his railway career as a fireman on the Central of Georgia Railway, and eventually became Assistant to Mechanical Engineer, Chicago, Milwaukee & St. Paul Railroad. He then turned his attention to signalling, and in 1893 was appointed Signal Engineer of the latter railway. In 1903 he became Signal Engineer of the New York Central & Hudson River Railroad (now the Lines East of the New York Central System), and remained in its service until his retirement. Mr. Elliott took an active part in the discussions of the former Railway Signal Association, of which he had been a charter member, and in 1898 Acting President, of its forerunner, the Railway Signaling Club. In 1918, after the Association had become the Signal Section of the Association of American Railroads, he was elected President. During his years of office as Signal Engineer of the N.Y.C. Eastern Lines great progress was made in the adoption on a large scale of automatic signalling and the standardisation of the speed signalling system of aspects, in conformity with the recommendations of the Railway Signal Association.

SIR RALPH COPE

Sir Ralph Cope, who was Chief Accountant, Great Western Railway, 1916-1938, is still in the best of health, and entertained a party of personal friends at the Devonshire Club on the occasion of his 82nd birthday on Monday last, September 18.

Railways and the Flying Bomb

(See pages 289 and 290)



Effecting repairs to the permanent way after a direct flying bomb hit on tracks at Bricklayers Arms Junction, Southern Railway (See page 290)

Civil Defence and railway personnel engaged on rescue and debris-clearance work at Charlton Station (See page 290)

Wimbledon Station and the Flying Bomb

Station buildings severely damaged

Interior of the wrecked booking office at Wimbledon

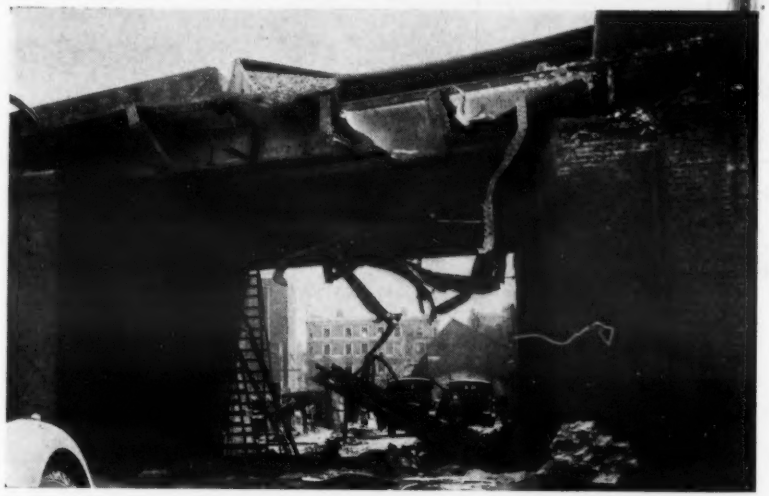
XUM

Railway Bridges and the Flying Bomb

Blast effect on wing wall of Nutfield Lane Bridge, between Coulsdon North and Earlswood, Southern Railway (*See opposite page*)

Steel trestle erected to support main girder while Nutfield Lane Bridge, Merstham, is under repair

The first flying bomb damage. L.N.E.R. bridge at Grove Road, Bow (*See page 290*)



Severely damaged girder work, and smashed wagons of coal train, at Camberwell, Southern Railway (*See opposite page*)

Railways and the Flying Bomb

Some examples of rapid restoration work on the Southern Railway, the London Transport railways, and the L.N.E.R.

"Except possibly, for a few last shots, the Battle of London is over." In these words, Mr. Duncan Sandys, Chairman of the Flying Bomb Counter-Measures Committee, prefaced a comprehensive account of the flying bomb attacks on London and Southern England, which he gave to a Press Conference on September 7. As a result, it is now permissible to give some indication of the effects of this attack on transport. As we pointed out in our issue of July 14 (page 45), every enemy attack on this country necessarily (though not always deliberately) has repercussions on transport, and particularly on the railway system. The flying bomb proved no exception, and, during the 80 days it was being launched against this country, it caused widespread blast damage to railway buildings and installations, and to a smaller extent tracks, with resultant delays and the need for emergency repair. Nevertheless, the duration of the delays was remarkably short, as the well-tried organisations of the main-line railways and London Transport once again met the heavy demands made on them with outstanding speed and efficiency. Apart from debris clearance, they had to tackle less heavy work than might have been expected, because of the small penetrative power of the missile used.

The first flying bomb to reach this country landed in the early hours of June 13 at Cuckfield, Sussex, and shortly afterwards one fell on the L.N.E.R. line at Grove Road, Bow, but the real attack began during the night of June 15-16, and continued intermittently, both day and night, until August 31. In all, some 8,000 flying bombs were launched against this country, and approximately 2,300 of them reached the London area. Others fell in many places in the southern half of England, which, for this purpose, was officially regarded as the area south of a line from Bristol to the Wash. A few strayed as far as Norfolk and Northampton, and there was a light-scale 5-day attack in July upon the Portsmouth and Southampton area. It speedily became clear that the weapon was not accurate enough for effective use against such a comparatively small target as the two last-named towns, and the bulk of the attack was aimed at the Greater London area, 18 miles wide by 20 miles deep, which offers, in the words of Mr. Churchill, "the unique target of the world for the use of a weapon of such inaccuracy." About 92 per cent. of all the fatal casualties from these bombs occurred in the London region.

It has since been made known that the 13 boroughs which suffered most severely were the following, arranged in descending order of intensity:—

1. Croydon	8. Lambeth
2. Wandsworth	9. Orpington
3. Lewisham	10. Coulsdon and Purley
4. Camberwell	11. West Ham
5. Woolwich	12. Chislehurst
6. Greenwich	13. Mitcham
7. Beckenham	

All the main-line railways, as well as London Transport, were affected, but naturally the Southern Railway was the principal sufferer for geographical reasons, and the L.N.E.R. came next, by reason of the damage which it sustained in the Stratford area.

Certain types of damage naturally resulted in some disorganisation to train services, and there was also the effect of staff absenteeism because of damage to their own residences. Nevertheless, these difficulties were overcome with remarkable rapidity, and all grades of railway employees placed their duty to the public before personal safety. The speed with which damage was repaired reflects great credit on the engineering and permanent way staffs, from the Chief Civil Engineers downwards, who held themselves in readiness at all hours of the day and night to deal with incidents, and seldom failed to have the line working in time for the next peak traffic. As widespread blast is the main characteristic of these flying bombs, most of the damage was to buildings and signalling installations, but in a number of instances both overline and underline bridges, and other structures carrying the track, received damage and involved repair work of engineering interest, and the following are interesting instances, for the details of which we are indebted to Mr. V. A. M. Robertson, Chief Civil Engineer, Southern Railway.

Overline Bridge Carrying Main Electrified Lines

A flying bomb fell and exploded about 10 yd. from the down side corner of the north abutment of a very skew bridge at Nutfield Lane, Merstham, which crosses two electrified lines and carries an important main electrified line out of London. The bridge consists of two steel curved chord through truss girders of 91 ft. 9 in. skew span between centres of bearings. The square span is 36 ft. 6 in. between faces of brick abutments. The floor system is composed of underslung steel cross girders generally at 8 ft. 4½ in. centres at each truss vertical carrying longitudinal through rail-bearers with inset short rail timbers. The decking is of steel plate. The main girders have no top lateral or portal bracing, and are dependent for their lateral stability on the rigidity of the cross girder and connections. Because of the sharp skew, many of the cross girders bear at one end directly on the abutments and are held down by anchor bolts. The main girders rest on cast-iron rocker bearings which bear on sandstone bedstones set in the brickwork of the abutments.

The explosion of the flying bomb formed a crater 25 ft. in dia. and 10 ft. deep (much deeper than usual), and completely demolished an air raid shelter which was situated where it fell. The blast lifted the bridge momentarily off the north-east corner bearing, which was found to be fractured, and the brickwork of the corner of the abutment supporting it was cracked and displaced. The span as a whole was displaced very slightly on the remaining three bearings, and the floor and cross girders remained lifted off the west side abutment to about 1 in. as a maximum. Anchor bolts had to be burned out to free the floor and cross girders and allow them to drop back into the normal position.

The damage to the main girders was confined to a few splinter holes of no consequence. Five lengths of conductor rail on each track were blown off their insulators and the permanent way was put out of gauge. High tension and pilot cable troughs were damaged, and telegraph wires destroyed. The damage to the abutment and main bearing necessitated the erection of a temporary support to permit traffic, and a military steel trestle was therefore designed and erected on a continuous timber raft which was laid on a site levelled for this purpose. This trestle gave support to the main joint between the second and third girder panels, and, by the provision of 14 in. x 14 in. timber struts passed up through the bottom chord, the reaction at this point was shared between the top and bottom main joints of the truss.

Both roads were open for traffic at slow speeds on the afternoon of the day after the incident. It is interesting to note that the drawings of the temporary repairs to the structure, including all stiffening of the main girders and design of the trestle to carry 250 tons, were completed by two draughtsmen in 2 hr. 20 min.

Another Overline Bridge Incident

At Camberwell, an overline bridge carrying four tracks and serving an important north to south goods line was hit. At the time of this incident, which occurred on a Saturday, a goods train conveying coal was passing across the bridge on the down local line, and it is thought that the bomb struck this train in the first instance. The force of the explosion was directed downwards and towards the up side and the residential property beyond the railway. That portion of the train running over the bridge was wrecked, and the girderwork beneath partly collapsed. The whole of the steelwork supporting the local lines was damaged beyond repair and became a total loss. That supporting the main line was displaced vertically and laterally a matter of several inches, and the parapet girder distorted beyond repair. The damage to the permanent way extended in varying degrees to all tracks. The local lines and up main line were broken and distorted, while the down main line was affected by the displacement of the bridge. The up corner of the down end abutment was fractured, the adjacent bedstones broken, and the brick parapets of the arched viaduct approaches to the bridge blown over. All lines were blocked. This bridge, which is of a semi-trough girder type completely decked in steel, carries four tracks over a clear skew span of 27 ft. 6 in. and provides a headroom in excess of 17 ft.

The removal of the damaged train, the first stage of the work, was undertaken by the Chief Mechanical Engineer's Department. Concurrently with this, the packing of the trough girders supporting the main lines was done, as it was decided that these girders were fit for further use. The damaged train was sufficiently removed for access to the damaged bridge, and the down main line was opened for steam traffic the same day and made available for electric traffic the next day.

On Sunday the destroyed portion of the bridge under the local lines was cut by oxy-acetylene flame and removed to the street below by a 36-ton steam crane, there to be cut up and removed from the site. Preparation of concrete cills for temporary beams followed, and these lines were restored. On the following Tuesday morning both local lines were opened for normal traffic. The decking and parapet of the bridge were completed under normal traffic conditions.

An Important Suburban Station

Charlton Station has two separate through traffic platforms with a terminal platform on the down side. Access is obtained directly off an overbridge situated at the down end of the station, and the booking office, etc., is carried over the line on a structure alongside the road

Severely damaged girder work, and smashed wagons of coal train, at Camberwell, Southern Railway (See opposite page)

The first flying bomb damage. L.N.E.R. bridge at Grove Road, Bow (See page 290)

XUM

bridge, with an independent staircase leading to each platform. The bomb fell near these buildings and the main force of the blast was directed against the station buildings, platform roofs, and property having a frontage on to the main road and adjacent to the up side of the line. Damage extended to the whole of the station building, platform roofs, and staircases, which were destroyed. The substructure which carried the booking office over the line, together with the road bridge, was left intact. Both lines were heavily strewn with debris and blocked to traffic. The station was closed.

The Civil Defence Services, including heavy rescue units dealt with casualties. This work took prior place, and proceeded with caution because of the dangerous condition of walls left standing in an unstable condition. In one instance, the latter threatened the safety of the line and had to be felled when the casualties were cleared. The work of clearing the running lines of debris was effected concurrently with the work of the Civil Authorities, and both lines were opened for passing traffic on the afternoon after the incident.

In order to re-open the station to passenger traffic at the earliest opportunity, it was considered advisable to abandon the site of the existing buildings, where much clearing remained to be done. Moreover, the work of temporarily rebuilding the staircases and providing emergency booking facilities would be considerable. In fact, to have built temporary works on the old site would eventually hamper the work of reinstatement. In consequence, it was decided to provide temporary booking facilities on the down platform, with direct access from the main road, and further to erect a temporary footbridge to serve the up platform. A temporary booking office in timber was provided, and the footbridge was constructed of military-type trestling, steel beams, and timber. The down side platform was opened for passenger traffic on the day after the incident.

Bricklayers Arms Junction

At Bricklayers Arms Junction, which gives access to the famous goods depot, there are five tracks as follow:—

Siding leading to carriage roads Nos. 1 and 2
Up local line
Up main line
Down main line
Down local line

In addition, there is a concentration of point-and-crossing work which serves the goods depot branch. The incident occurred at the approach to this junction. The two up lines were destroyed, and the adjacent tracks forced out of alignment. Blast damage extended to two signal boxes, and there was other, but lesser, damage to the Southern Railway Company's property in the neighbourhood. All lines were blocked. The crater formed was 12 ft. in dia. by 7 ft. deep. This was refilled and the permanent way reinstated, including two damaged crossovers. All lines were reopened 13½ hr. later on the same day as the incident occurred.

Some London Transport Incidents

The following brief notes give some idea of the kind of damage which was sustained by the London Transport railways, and the speed with which emergency repairs were effected:—

When the track and supporting structures near Ravenscourt Park were damaged late at night, the viaduct carrying the District and Piccadilly lines between Hammersmith and Ravenscourt Park was seriously impaired. Although the damage appeared at first to be so extensive that the lines would be closed for a week, early next morning the tracks had been cleared sufficiently and repaired to allow the District Line service to be resumed, subject to a speed restriction of 5 m.p.h. A few hours afterwards the Piccadilly Line was in action as well. Speed restrictions had to be enforced for some time afterwards. Another flying bomb fell in almost the same spot a few days afterwards, necessitating further repair.

Aldersgate Station was also damaged, and the tunnel roof pierced, but the train service was interrupted for only 6 hr. It took a week to make the station safe for passengers, and during that period the trains ran through non-stop.

Permanent way, station, and signals were damaged, and the sub-station blasted, at Moorgate, but the trains were suspended for only 5 hr.

At New Cross Depot, the buildings, track, and stabled trains were damaged, and the service was interrupted for 15 hr.

Station buildings and track were also damaged extensively at Walham Green, and the service was interrupted until a single line track was put into action.

At Surrey Docks, where, among other things, machinery was blasted, the train service was suspended for 9 hr. A speed restriction was in force for some weeks afterwards.

Between South Kensington and Gloucester Road the roof of the Metropolitan Line tunnel was pierced, and debris fell on the lines beneath. There was an escape of gas into the District Line tunnel. As a result, the Inner Circle service was severed, but it was restored after only 13 hr.

When West Ham Station was damaged, 108 trolleybuses also suffered from blast. The overhead trolley-wire junction was destroyed, but the service was operating normally 13 hr. afterwards.

Rapid L.N.E.R. Bridge Repair

The first flying bomb to reach the London area badly damaged a bridge at Grove Road, Bow, carrying the four tracks of the L.N.E.R. between Liverpool Street and Stratford in the early hours of June 13. The damage included the complete demolition of the northern half of the bridge carrying the up and down fast lines, and the severance of the southern half carrying the up and down local lines. The work of repair was begun at 9.30 a.m., as soon as Air Ministry and other officials had completed their examination of the damage. The steel flooring was removed with the aid of oxy-acetylene flames, and rolled-steel joists (kept at strategic points for emergencies of this kind) were then placed in position. Timber trestles were provided under these to reduce the span; one was placed on each side of the roadway near the pavement, so as to cause as little obstruction as possible. By 7.45 p.m. on the day after the damage, the work of restoring the northern side was completed. The first train to cross was the 9.5 p.m. from Liverpool Street.

The remainder of the bridge was then dealt with similarly, and replaced by joists supported on trestles, but this was accomplished without interference with the traffic that had been resumed over the northern half. By 7 p.m. on Friday, June 16, the work of restoration was complete and all four tracks had been brought into use. Apart from the damage to the bridge, tracks had been torn up and distorted, and seven cables and numerous wires across the bridge, and a power cable below, were severed. Temporary cables were installed and other arrangements made so that full communication was restored by 5 p.m. on the first day. In addition, L.N.E.R. electrical engineers repaired the power cable, enabling London Transport trolleybus services to be resumed first thing on Saturday morning.

The damage necessitated extensive train diversions. Main-line trains normally using the bridge were run *via* Cambridge to and from Liverpool Street, and other trains were either terminated at or started from Stratford or were diverted to run to and from Fenchurch Street; certain trains were also run *via* Tottenham and Stratford. When the northern half of the bridge was replaced, it was possible to resume normal main-line services, and also the suburban services to and from Ilford, Shenfield, Chelmsford, and Southend, although some continued to use Fenchurch Street to ease the pressure. For the latter reason it was necessary to run the Loughton service to and from Stratford until the bridge was completely restored.

Kent Train Derailment

It may now be stated that the fatal derailment on the Southern Railway on the evening of August 16, which we recorded briefly in our August 25 issue (page 198) was due to a flying bomb. The train concerned was a passenger train from Victoria to the Kent coast. The bomb fell 20 yd. in front of it, on a bridge carrying the line over a country lane beyond Rainham Station, between Gillingham and Sittingbourne. The line is curved at this point. The driver saw the approaching bomb and made an emergency brake application, but was not successful in stopping the train before it reached the bridge, in which a gap was made. The locomotive was overturned and dragged the first two coaches with it. Eight persons were killed, and 16 seriously injured.

CONVERSION FACTORS AND TABLES.—A revised and enlarged edition of British Standard Specification No. 350 has been issued, comprising linear, square and cubic measures; measures of capacity, weights, speeds, stresses and pressures; weight a unit length, densities, concentrations, forces, moments, moments of inertia, work, heat, energy, and power. There are temperature conversion charts and tables, and wire and sheet metal gauge sizes expressed in decimals of an inch and in millimetres. Copies may be obtained from the Publications Department, British Standards Institution, 28, Victoria Street, London, S.W.1, price 3s. 6d., post free.

AUSTRALIA AND BRITISH INDUSTRIES.—When discussing post-war business prospects recently, Mr. Curtin, the Australian Commonwealth Prime Minister, said that special efforts would be made to attract new British industries to Australia, both to help in the general task of reconstruction, and to give effect to the Federal policy of expanding Australia's population. The Government would welcome specific proposals from United Kingdom interests anxious to establish industries in Australia after the war. It might be prepared to take over after the war, and operate for civilian production, some munitions factories the Government had built during the war. The strengthening of Australian economy through the establishment there of U.K. industry, capital, and key technicians would enable Australia to maintain British influence in the Pacific and Australian workers to learn new trades.

TRANSPORT SERVICES AND THE WAR—260

New Double-Deck Buses

The Ministry of War Transport has announced that it is prepared to receive applications through Regional Transport Commissioners for licences to acquire new Guy high-bridge double-deck buses fitted with 5-cylinder Gardner engines for delivery in November and December.

Civilian Air Raid Casualties in August

The Ministry of Home Security has announced the following figures of civilian casualties due to air raids in the United Kingdom during August :—

Killed (or missing believed killed)	1,103
Injured and detained in hospital	2,921

The casualties are classified as follow :—

	Men	Women	Under 16
Killed (or missing believed killed)	506	508	89
Injured and detained in hospital...	1,273	1,507	141

Flying-Bomb Civilian Casualties

As it has already been announced in the House of Commons that the whole of the civilian casualties in the United Kingdom due to air raids during June were the result of the flying-bomb attack, a close approximation to the total of killed and injured in the 80 days that the main attack lasted may be obtained from the following summation of the figures officially announced by the Ministry of Home Security for the months of June, July, and August :—

Killed or missing believed killed	5,479
Injured and detained in hospital	15,934

The casualties were classified as follow :—

	Men	Women	Under 16
Killed (or missing believed killed)	2,244	2,683	552
Injured and detained in hospital...	6,170	8,645	1,119

D.B.S.T.—Altering Railway Clocks

At 3 a.m. on Sunday last, September 17, the hands of some 37,000 British railway clocks were put back one hour with the end of double summer time. There are 7,000 passenger stations, at all of which the railways are under an obligation to exhibit a clock in a prominent public place. Clocks are also provided at every one of the 10,358 signal boxes and the 6,900 goods depots. Contractors are engaged continuously in maintaining thousands of railway clocks, and in the main it fell to them to make the necessary alterations. Signalmen are responsible for altering the clocks in their boxes. A record of the alteration was made in the daily report of every signalman, guard, or other railway employee. Necessarily hundreds of trains arrived at their destinations an hour earlier than scheduled.

Producer-Gas Scheme Ends

In accordance with his undertaking that he would not continue the Government producer-gas scheme any longer than was necessary, the Minister of War Transport has reviewed the position in the light of the improved war situation and has decided that the scheme can now be closed. Operators of goods or passenger vehicles who so desire may, therefore, revert to liquid fuel. The Minister thanks those bus undertakings and commercial goods vehicle operators who have co-operated in this experiment. Fortunately, a large-scale conversion to producer-gas has proved unnecessary.

It may be recalled that operators with substantial fleets of buses were asked to convert 10 per cent. of the vehicles to producer-gas. In February last 50 per cent. cuts in the 1944 programme of conversion were allowed by the Ministry of War Transport as a result of representations by the motor transport industry. About 75 London Transport buses had then been converted to producer-gas.

No Summer Time in South Africa

Summer time will not be introduced in the Union of South Africa this year. In a recent interview Senator C. F. Clarkson, Minister of the Interior, said that summer time had served its purpose during the past two years, but now that it was no longer necessary the Government had decided not to re-introduce it, since it did not meet the wishes of the majority of the people.

German Swiss Rail Traffic Suspended

All railway traffic from Basle northward into Germany was suspended on Sunday, September 10, probably because of Allied air attacks on every train that shows itself, according to Zurich messages, and it was subsequently stated (on September 12) that all railway traffic between Germany and Switzerland was virtually stopped.

Heavy road motor traffic into Germany has continued across the Hüningen Bridge, which crosses the Rhine on the Franco-German frontier a few miles north of Basle. It is said to consist of military vehicles.

Flying Bomb Destruction in Belgium

Prominence has been given, both in the daily Press and also in B.B.C. broadcasts, to the success of 16 Typhoon aircraft in destroying a 40-vehicle trainload of 120 flying bombs at Schulen, near the Albert Canal in Belgium, on September 1, about mid-day. The result was to devastate about half a mile square of the neighbourhood, and heavy explosions shook the country until 6.30 p.m. The story as told by the Stationmaster of Schulen to a British correspondent was as follows: " I was in my home, more than three miles away. The doors and windows caved in and the tiles were taken off the roof. Only two civilians were injured, but all the Germans on the train were blown into pieces. By the side of the track was a small factory where the Germans used to make coal gas to drive cars. The factory has lost its face and its chimney is only a pile of rubble. Six railway wagons still cling to the line. The rusty remains of anti-aircraft guns and thousands of anti-aircraft shells, a few dozen mutilated German helmets, water bottles, and Army textbooks still lie about. But huge lengths of rail which 100 men could not lift have been tossed into the potato crop four fields away. Heavy steel wagons have been thrown about, and there are craters deep enough almost to hold St. Paul's Cathedral. Belgian linesmen are already trying to repair the railway, but it will take a long time."

U.S.A. Rolling Stock Production

During 1943, American works built for domestic use 830 locomotives, 28,790 bogie wagons, and 661 troop sleeping cars and kitchen cars, but no passenger coaches. Of these, 773 locomotives and 28,708 wagons went to Class I railways; the former was the largest number built in a single year since 1930, and the latter the smallest number since 1940. In 1942 the new locomotives supplied were 712, but the wagons totalled 63,009; the heavy decline in the latter is due in part to the attempt of the War Production Board to force on the railways a composite steel and wood type of wagon, which would have increased maintenance costs, and was resisted by certain railways, in place of the all-steel types that are now standard. Of the locomotives, 429 were steam, 15 electric, and 329 diesel-electric, as compared with 308 steam and 404 electric and diesel-electric in 1942. The wagons were divided into 15,137 hopper, 8,792 gondola, 2,446 flat, 1,923 box, 356 motorcar box, and 54 miscellaneous wagons.

Builders went into 1944 with 35,739 wagons on order for Class I railways—13,651 hopper, 10,944 box, 3,869 gondola, 3,508 motorcar box, 1,365 flat, 200 refrigerator, and 200 miscellaneous wagons in all. The locomotives on order totalled 988, of which 955 were for Class I railways, and comprised 339 steam, 3 electric, and 613 diesel-electric locomotives. The greatly-increased demand for diesel power is particularly notable. It was expected by the War Production Board that the total wagon production capacity of U.S.A. manufacturers, for their home railways, would be between 60,000 and 70,000 bogie wagons during 1944, and that permission will be given to begin the construction of 500 passenger vehicles before the year ends. The New York Central System alone has 300 passenger cars on order, awaiting this W.P.B. release.

Restricting U.S.A. Government Travel

Early in July last the United States Office of Defense Transportation tightened up its restrictions on the wartime use by the Government of special trains, special cars, and extra sections of existing trains. When the official order (ODT No. 24) was issued early in 1943, " freezing " passenger train schedules, the exception was made that special trains or cars, or extra sections of ordinary trains, might be operated when necessary at the request of Government Departments or agencies, to handle Government traffic. An amendment of this Order, effective from July 10, restricts these facilities to movement of the Armed Forces, prisoners of war, and Government-recruited workers, and all other special train or car facilities are prohibited unless under express authority of the O.D.T.

Heavy Traffics in Salvador

Railway transport indexes reached a new high level in Salvador during the first quarter of 1944. The index figure of total goods tonnage moved averaged 212 (against 100 in 1938), compared with 188 during the corresponding period of 1943 and about 130 in a normal pre-war first quarter. A peak of 226 was reached in March. On the largest railway (the International Railways of Central America), wagon loadings of strictly local goods, as distinct from export-import movement, averaged 17 per cent. more than during the first quarter of 1943. Passenger traffic was 50 per cent. greater than a year ago, and nearly 220 per cent. above the first-quarter normal.

General business conditions in Salvador continued unusually good until affected by the political disturbances of April 2 to 4. As a precautionary measure, the public markets were closed for an extended period. Damage caused by the disturbances was heavy. Two large blocks of property in the centre of San Salvador were destroyed by fire, resulting in property and merchandise losses of between $500,000 and $700,000. Despite the political events, the general economic prospects continued to be favourable.

Paris Trains Resumed

The suburban train service in the Paris region was restored on September 5.

Paris-Cherbourg Train Service

The railway between Paris and Cherbourg has been reopened and the first train from the coast reached Paris on September 15.

The Importance of Tourist Traffic

Invisible exports through tourists in this country equal to wool or coal exports—A survey by the Travel & Industrial Development Association

The Travel & Industrial Development Association has done good work in publishing at this juncture a memorandum on a promising "export" industry under the title "Britain—Destination of Tourists?" by Mr. R. G. Pinney* who in free narrative form places a good many economic home truths in a stimulating way.

The memorandum looks forward to a vast expansion in the world's tourist traffic and says that, if Great Britain is to obtain her fair share, far-reaching measures will be necessary. Before the war Great Britain's income from overseas visitors sometimes exceeded £30,000,000 a year, a figure only slightly less than the value of the annual exports of coal, or woollen goods, but it is believed that this figure could be increased to nearer £100,000,000 a year.

Among Great Britain's advantages in the world tourist movement is the fact that eighty million persons of British origin are scattered throughout the world, and that the English language is spoken by hundreds of millions of the world's population.

Mr. Pinney outlines the pre-war tourist business statistically and we quote the following figures as typical:—

ESTIMATED NUMBERS OF VISITORS TO THE UNITED KINGDOM

Year	Foreigners	Overseas British
1921	318,463	113,776
1931	351,338	186,908
1932	318,720	156,368
1933	380,424	160,757
1934	398,670	164,561
1935	450,952	176,215
1936	525,310	189,104
1937	558,516	225,377
1938	505,308	215,121

ESTIMATED TOTAL EXPENDITURE OF VISITORS TO THE UNITED KINGDOM

Year	Unadjusted total	Total adjusted to cost of living index
	£	£
1921	18,368,465	25,348,000
1931	27,067,890	24,361,000
1932	24,593,925	21,643,000
1933	24,325,595	20,677,000
1934	25,665,200	22,072,000
1935 (*a*) ...	27,258,010	23,714,000
1936	30,205,075	27,185,000
1937 (*b*) ...	33,299,455	31,311,000
1938	30,506,740	28,291,000

(*a*) Jubilee (*b*) Coronation

Here, Mr. Pinney explains, is a tourist industry of first-class proportions, comparable in value with that of the U.S.A. and nearly half as large as that of France—the country "with the largest credit estimate" from tourists. It compares in value with the exports of the United Kingdom's woollen industry or of her coal; for, in 1937, the United Kingdom's main visible exports were as follow: Cotton yarn and manufactures, £68,509,000; machinery, £49,741,000; iron and steel and manufactures thereof, £48,370,000; vehicles (including locomotives, ships, and aircraft), £39,924,000; coal, £39,654,000; woollen and worsted yarns and manufactures, £35,503,000; chemicals, drugs, dyes, and colours, £24,653,000.

Another point of great significance is noted. The value of France's tourist industry fell from the peak of £80,000,000 to £20,000,000 in five years during the depression, and Canada's suffered an almost proportionate decline—indeed, there was a sharp falling off in the tourist receipts of almost every country. But whereas the United Kingdom's exports of merchandise fell from £839,000,000 in 1929, to £447,200,000 in the same period, the value of the United Kingdom's tourist industry was not nearly so seriously affected (£31,745,000 in 1929 and £22,072,000 in 1934). Great Britain's tourist industry therefore was not only extensive and valuable, it was also relatively stable.

The work of the Travel Association in stimulating the tourist trade in this country is outlined. At the time of its formation, Mr. Pinney explains, the association was promised financial support by the Chancellor of the Exchequer (Mr. Churchill). This materialised in the shape of a token payment of £5,000 in 1929 (about 0·02 per cent. of the tourist industry's total receipts), which was reduced to £4,000 in subsequent years, until restored in 1936 and thereafter increased.

Otherwise the association was financed from a fund built up from membership subscriptions, contributions from railway and shipping companies and other undertakings, from public bodies, and from local authorities in England and Wales, under the Local Authorities (Publicity) Act of 1931 (promoted by the association).

INCOME OF THE TRAVEL ASSOCIATION

Year	Government	Other sources
	£	£
1929-30	5,000	11,041
1930-31	5,000	12,909
1931-32	5,000	15,258
1932-33	4,000	21,960
1933-34	4,000	23,658
1934-35	4,000	29,767
1935-36	4,000	32,174
1936-37	5,000	35,196
1937-38	6,658 (*a*)	34,827
1938-39	15,000	45,487
1939-40	17,354 (*b*)	40,673

(*a*) Included £1,658 for Coronation year publicity
(*b*) Included £1,527 for Scandinavian offices

The Travel Association's income was, however, obtained only with difficulty, and in its search for revenue it somewhat compromised its intended impartiality by canvassing for subscriptions in exchange for which preferential recommendations were given. For example, it compiled a hotel guide which contained only the names of subscribers.

In 1938, in response to frequent representations from the association, the Government's grant was increased to £15,000, and it was agreed that future annual grants should be considered on a basis of £1 from the Government for every £2 of non-Government subscription income in the previous year.

At that time (1938-9) the association's income, free of earmarkings for specific publicity (*i.e.*, Government and other subscriptions), was made up as follows:—

	£
H.M. Government	15,000
Local authorities	12,451
Main-line and private railway companies ...	4,274
Hotels and restaurants	2,869
Trades	1,811
Shipping companies	1,565
Theatres, cinemas, etc.	535
Travel agents	308
Miscellaneous	301
Air and road transport undertakings, etc. ...	260
Chambers of Commerce	33
	£39,407

In addition, £21,080 was paid to the Association for specific publicity and other special purposes, making the total £60,487 for 1938-9.

Membership consisted of:—

Hotels and restaurants	1,007
Local authorities	308
Trade and industry	151
Miscellaneous	75
Air and road transport undertakings, etc. ...	23
Shipping companies	20
Travel agencies	19
British railway companies	8
	1,611

The pioneer work of the association was varied. It endeavoured to secure certain legal reforms and changes in regulations affecting the tourist industry; and it initiated and, with the co-operation of its members, carried out press advertising abroad.

The revival of international tourist movement after the last war was delayed only for a minimum of time and in this book there are suggestions for seeing that no opportunity is lost of stimulating travel into this country. This includes the continuance of an overhaul of the hotel system and of our licensing laws. Matters which are discussed impartially and interestingly in the book include the development of the national tourist industry by the Government as an object of policy; the appointment of an official national tourist organisation; and the urgent need to re-establish all services required by tourists.

(*See editorial article, page* 276)

ARGENTINE PLANT TO PRODUCE RAILWAY EQUIPMENT.—It is reported by Reuters that a project presented by the administration of the Argentine State Railways for the construction of a heavy railway equipment manufacturing plant has been approved. The plant is to be erected at Cordoba as an annex to large workshops there owned by the State Railways. The new plant is to concentrate on the production of axles and rims for locomotive wheels which can be used to replace and/or to repair existing material. The cost of the plant is estimated at 13,000,000 pesos.

EXPRESS MOTOR-VANS IN SWITZERLAND.—The three high-speed motor-vans placed in service on the Swiss Federal Railways in 1940 (described in *The Railway Gazette* for May 24 of that year) have been sold to the Bodensee-Toggenburg and South Eastern Railways, which, with a short intervening section of the Federal Railways, form a route from Arth-Goldau, on the Gotthard line, to Romanshorn on the Lake of Constance. It is understood that they will be useful for working over severe grades longer trains than can be handled conveniently by the heavy motor coaches and locomotives of the Bodensee-Toggenburg Railway and the more-recently built lightweight motor coaches of the South Eastern Railway.

NEW NATIONAL INDUSTRY IN BRAZIL.—Difficulty in the import by Brazil of manufactured goods has led to the floating in that country of a company which has as its object the production and sale of materials used in civil, electrical, and mechanical engineering. It has taken the name of Companhia Brasileira de Sinalisação S/A., and will specialise in the manufacture and installation of signalling apparatus for railways, roads, ports, and other services. It is prepared also to represent other manufacturers of similar articles. The board is composed of Senhor M. J. de Almeida (President); Senhor Leopoldo Calderon (Commercial Manager); Senhor H. M. de Almeida (Technical Manager); Senhor J. T. de Fonseca; Dr. O. M. Ferraz; and Senhor R. V. Toller.

* Published by The Travel & Industrial Development Association of Great Britain and Ireland, 6, Arlington Street, London, S.W.1. Price 2s post free

Staff and Labour Matters

Industrial & Staff Canteen Undertakings Wages Board

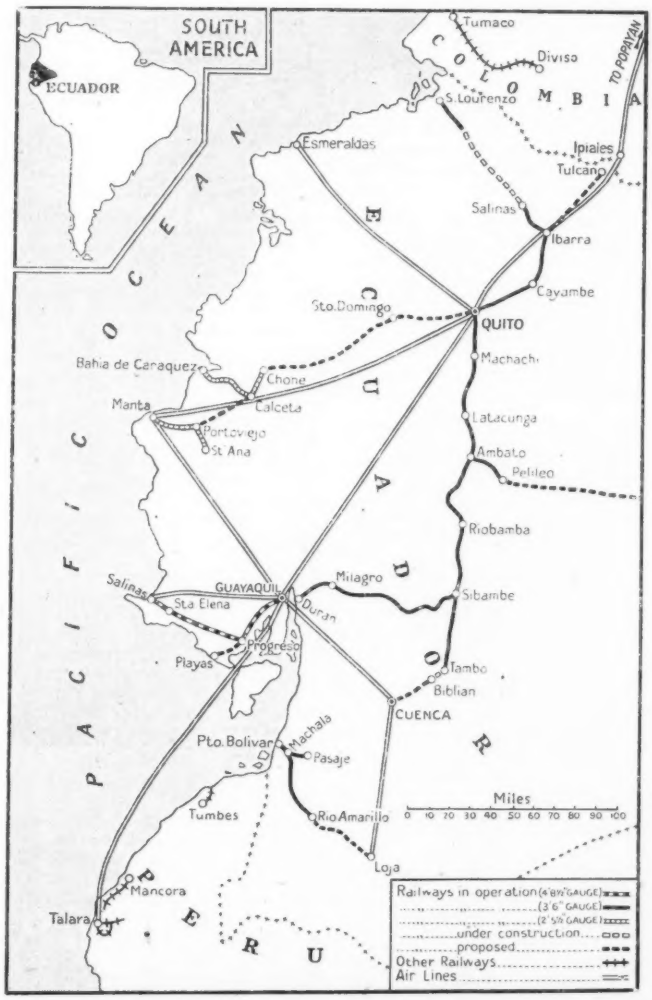
The first meeting of the Industrial & Staff Canteen Undertakings Wages Board (the appointment of which was recorded in our last week's issue), established under the Catering Wages Act, 1943, took place in London on September 6, under the Chairmanship of Mr. W. Gorman, K.C. The Minister of Labour & National Service was present at the opening of the proceedings, and expressed the good wishes of the Government to the board. He said that its powers were broader than those of trade boards, and allowed the tackling of problems other than wages; and that the board would be able to make representations on matters affecting the general improvement and development of the industry. It had been deliberate Government policy to keep canteens out of the household rationing system, and in making the Canteen Order the Government had had two ideas in mind—the feeding of workers, and a reserved form of communal feeding in the event of other means of feeding being dislocated by enemy action.

Mr. Bevin said he hoped that the wages board would study the feeding of young people. The experience of the mobilisation of our population had revealed a low physical standard. Many young people left school with a fairly high physical standard, but between the ages of 14 and 18 there was a falling-off. It had been found, however, among the young people now being called up that, in spite of wartime rationing, the physical standard was generally higher than at the beginning of the war. It would pay employers and industry generally to look after such young persons. He then thanked the members of the board for agreeing to serve in that capacity.

After the Minister had left the meeting, the Chairman referred to the importance of the task to which the board had been called. The fundamental consideration was that industrial catering was to be considered as a distinct industry, with its own problems. Although it was true that industrial and staff canteens formed a cross-section of so many industries, industrial catering was not to be considered as something merely ancillary to those industries the workers of which were catered for by the canteens. He emphasised that the true measure of the success of the wages board would be in the agreement reached between the various representatives on the matters which they were called on to consider.

Transport in Ecuador

In describing the railways of Ecuador in our issue of November 19, 1943 (page 505), we pointed out that the division of the country by the great chain of the Andes, running north and south, the scarcity of navigable waterways, and the great differences in levels, resulted in the transport facilities being poor, and that the defect was remedied only partly by air transport. The map which accompanied that article showed substantial schemes for linking up the isolated railways, but we observed that very little construction was in hand, as railway development was retarded both by difficult terrain and by inadequate finance. Subsequently (on August 4 last), we recorded that railway construction in Ecuador had been almost entirely at a standstill for some time. There are no railways in the eastern, north-western, or southern sections of Ecuador, and highway facilities are limited. The accompanying map shows the internal air lines at present working, and indicates how these link the isolated railways.



Railways and internal air lines of Ecuador

Air lines linking Ecuador with neighbouring countries are provided by Pan American-Grace Airways Inc. (Panagra), while the internal services are operated by Aerovias del Ecuador-Panagra, which is an operating division of the larger organisation that replaced the German-owned Sociedad Ecuadoriana de Transportes Aereos (Sedta). This company maintains more than 900 miles of unduplicated air route in Ecuador, centred on Quito, the capital, which is nearly two miles above sea level. There is a daily service between Quito and Guayaquil, which makes the trip in a little over one hour, compared with the fastest train service of 12 hours. The Quito-Esmeraldas service is weekly; the Quito-Manta twice weekly; the Manta-Guayaquil also twice weekly; and the Guayaquil-Salinas twice weekly; and the Guayaquil-Cuenca-Loja thrice weekly. There is also a service to Ipiales (Colombia), just over the border from Ecuador, and connected with Tulcan (seven miles away) by a modern highway. A link is made at Ipiales with the services of the Aerovias Nacionales de Colombia (Avianca), including one to Popayan, the southern railhead of the main Colombian railway system.

Loja, in the valley of the River Zamora, capital of Loja Province bordering on Peru, is at the junction of the River Malacatos with the River Zamora. A projected transcontinental rail and water artery will be available when the railway is completed to Loja from Puerto Bolivar on the west coast, making it possible for traffic to go by rail from the Pacific to Loja and continue eastward to Belem, Brazil, by the River Amazon and its tributaries.

DOMINION ATLANTIC RAILWAY COMPANY.—This company, which is a subsidiary of the Canadian Pacific Railway Company, has given notice of redemption at 105 on March 1, 1945, of the £440,000 outstanding 4 per cent. second debenture stock of 1956.

Notes and News

Entre Rios Railways Co. Ltd.—Payment will be made of interest on the 4 per cent. debenture stock for the six months to September 30, 1944, on the due date, namely October 1.

Institute of Transport Presidential Address.—The presidential address of Mr. R. Kelso to the Institute of Transport will be delivered in the lecture theatre of the Institution of Electrical Engineers, Savoy Place, London, W.C.2, on November 13 next, at 5.30 p.m. (instead of on October 3 as previously announced).

Post Office Railways.—By courtesy of Mr. A. A. Golding, Manager, Post Office Railways, Mount Pleasant, members of the London Section of the Permanent Way Institution will have the opportunity of visiting the Post Office Railways on Saturday, September 23. The party will be met at the entrance to the Inland Section in Rosebery Avenue, opposite Clerkenwell Fire Station, at the junction of Farringdon Road and Rosebery Avenue at 2 p.m. The nearest Underground Station is Farringdon.

Argentine Trade Balance.—In the first six months of 1944 the favourable trade balance of Argentina was 714,327,000 pesos (about £42,019,235 at 17 pesos to the £), compared with 436,998,000 pesos in the corresponding period of 1943. By comparison with the first half of 1943, the market value of imports in 1944 rose by 4·5 per cent., and the market value of exports increased by 33·7 per cent. Imports were from Brazil (143,963,000 pesos), the U.S.A. (72,489,000 pesos), and the United Kingdom (49,896,000 pesos).

L.N.E.R. Central Lost Property Office.—The L.N.E.R. has reorganised the arrangements for the tracing, recording, storage and restoration to the owners of articles and consignments which are found without address in trains and at the passenger stations in the Southern Area of the system. On and from September 18, a central Lost Property Depot, at Kings Cross, will absorb the work now performed in the sectional depots at Kings Cross, Liverpool Street and Marylebone Stations. All unclaimed articles left in trains or on the company's premises in the Southern Area and parcels found without address will reach the central depot in the course of a few days. This scheme will simplify tracing and reduce the circulation of inquiry forms from three to one, resulting in the prompt restoration of goods to owners.

Bombay, Baroda & Central India Railway Company.—In a circular to stockholders the directors recall that the company's management of the railways comprising the undertaking ceased on December 31, 1941, and that the board was charged with the duty of winding-up the company. Since then two interim distributions of assets have been made, namely, one of 100 per cent. on June 16, 1942, and the other of 7½ per cent. (1½ per cent. of which was paid less tax) on December 15, 1942. The final figure of the surplus profits due to the company in respect of the working of the railway for the last nine months of its contract, *i.e.*, to December 31, 1941, was not accepted by the Government of India until February, 1944. Immediate steps were then taken to establish definitely the company's liability for United Kingdom and Indian income tax and E.P.T., but difficulty is being experienced in arriving at a settlement. As soon as agreement has been reached the directors should be in a position, after obtaining the refunds due in respect of double taxation, to make the final distribution of assets, and to proceed with the dissolution of the company.

Floods Damage Transport Installations in Mexico.—A Reuters message states that many railway lines and airfields in four states bordering on the Pacific coast of Mexico were rendered unusable by torrential rain which accompanied a recent cyclone.

Emu Bay Railway Co. Ltd.—Revenue for the year 1943 was £104,743, and the balance, after providing £85,395 for traffic expenses, maintenance, management, etc., £5,600 for depreciation, £6,355 for taxation, and £25 for interest, was £7,368. From this balance is deducted a year's interest (£5,890) on the 4½ per cent. debenture stock, and £1,478 for exchange. £20 was brought forward, and the amount carried forward is £19.

Institute of Transport Graduateship Examination Lectures.—A course of lectures for the graduateship examination of the Institute of Transport has been arranged by the Ealing Technical College for the next session. The classes will be held on Mondays and Thursdays, from 7 p.m. to 9 p.m., The Institute also states that courses for the associate membership examination would be arranged if students be forthcoming. The nearest stations are Ealing Common, Ealing Broadway and South Ealing. The College is situated in Warwick Road, W.14, and a canteen is available from 6.30 p.m.

Permanent Way Institution.—A meeting of the Manchester & Liverpool Section will be held in the Lecture Hall of the City Technical College, Byrom Street, Liverpool, on Saturday, September 30, at 2.30 p.m. By the courtesy of Mr. W. K. Wallace, Chief Civil Engineer, L.M.S.R., members will be able to see the following sound films: "Junction Renewals"; "Measured Shovel Packing"; and "Repairs to Engines." Mr. N. W. Swinnerton, of Watford, will be present to comment on and explain features of the permanent way films. Taylor Bros. (Sandiacre) Ltd. has kindly invited members to tea at Lewis's Cafe, Ranelagh Street, after the meeting.

Brightside Foundry & Engineering Co. Ltd.—Trading profit for the year ended June 30, 1944, was £125,671 (£162,437) and rents, interest, etc., amounted to £1,632 (£663). Loan charges and fees required £428, and taxation took £50,816, against £87,475, leaving a net profit of £76,059 (£75,246). There is no transfer to general reserve, to which £25,000 was added in the previous year, but £25,000 (nil) is provided for war contingencies and £15,000 (nil) for special depreciation. The ordinary dividend is again 1s. 9d. on each 5s. share, equivalent to 35 per cent., less tax. A sum of £100,000 is carried forward, against £90,816 brought in.

Institute of Welding Programme.—On Wednesday, September 27, at 6 p.m., Mr. W. W. Watt, President of the Institute, will deliver a presidential address at a general meeting. A symposium on "Welding in British industry after the war" will be presented on October 25 at 6 p.m., when Mr. K. I. Hodgson will speak on "Automobile and general engineering," Mr. C. S. Lillicrap, C.B., M.B.E., on "Shipbuilding," Mr. K. N. Pemberton, M.I.Mech.E., M.I.N.A., on "Pressure vessels," and Mr. K. Sutton, D.Sc., F.R.Ae.S., on "Aircraft." On Wednesday, November, 29, at 6 p.m., Mr. W. Riddihough will present a paper on "Hardsurfacing by welding." All the above meetings will be held at the Institution of Civil Engineers, Great George Street, Westminster, S.W.1.

Thomas Robinson & Son Ltd.—An interim dividend of 2½ per cent. on the ordinary shares is to be paid on account of the year 1944, the same as a year ago.

Railway Accident in U.S.A.—It is stated that many persons were killed or injured near Terre Haute, Indiana, on September 14, when a train of empty

British and Irish Railway Stocks and Shares

Stocks	Highest 1943	Lowest 1943	Prices Sept. 19, 1944	Prices Rise/Fall
G.W.R.				
Cons. Ord.	65¼	57½	56½	+ ½
5% Con. Pref. ...	120½	108	115½	—
5% Red. Pref. (1950)	110½	106	105	—
5% Rt. Charge ...	137½	123½	131½	—
5% Cons. Guar. ...	135½	121 1/16	127½	— 1
4% Deb.	118	107½	114½	—
4½% Deb.	119	109 3/16	115½	—
4½% Deb.	124½	116	120½	—
5% Deb.	138	127	133½	— 1
2½% Deb.	77	72½	74½	—
L.M.S.R.				
Ord.	34 1/2	28	29½	+ 1
4% Pref. (1923) ...	66½	58	57	—
4% Pref.	80½	73	73½	— ½
5% Red. Pref. (1955)	105¾	102	103½	—
4% Guar.	107	98½	100	—
4% Deb.	109¾	103¾	105	—
5% Red. Deb. (1952)	111½	108	109½	—
L.N.E.R.				
5% Pref. Ord. ...	12 3/16	7⅛	8½	—
Def. Ord.	5⅛	3⅛	4½	—
4% First Pref. ...	66½	57½	57	+ ½
4% Second Pref. ...	36½	30½	30½	+ ½
5% Red. Pref. (1955)	99⅛	93	98½	—
4% First Guar. ...	102½	94	98	—
4% Second Guar. ...	93½	85⅛	89½	— ½
3% Deb.	86⅛	78⅛	82½	—
4% Deb.	109 7/16	101⅛	104½	—
5% Red. Deb. (1947)	106¼	102	103	—
4½% Sinking Fund Red. Deb. ...	108	103½	105½	—
SOUTHERN				
Pref. Ord.	80	72½	73½	—
Def. Ord.	26½	20⅞	24½	+ ½
5% Pref.	119½	106¾	114½	—
5% Red. Pref. (1964)	114	108½	113½	—
5% Guar. Pref. ...	136	122	127½	—
5% Red. Guar. Pref. (1957)	117	109½	113½	—
4% Deb.	117½	106	112½	—
5% Deb.	137	126	133	— 1
4% Red. Deb. (1962-67)	112	106½	109½	—
4% Red. Deb. (1970-80)	112	107	109½	—
FORTH BRIDGE				
4% Deb.	109	104⅞	104	—
4% Guar.	105	102½	102½	—
L.P.T.B.				
4½% "A"	125 11/16	114	120½	—
5% "A"	133 7/16	123	130½	—
3% Guar. (1967-72)...	100½	97	99	—
5% "B"	124	114	121½	—
"C"	72	53	67	— 2
MERSEY				
Ord.	34½	27	34	—
3% Perp. Pref. ...	68	59½	69	—
4% Perp. Deb. ...	104	102½	103	—
3% Perp. Deb. ...	83	78½	79	—
IRELAND*				
BELFAST & C.D.				
Ord.	9	6	10	—
G. NORTHERN				
Ord.	24½	16	24⅜	— 1⅛
Pref.	—	—	40½	— 1½
Guar.	—	—	63	— 2
Deb.	—	—	83¾	— ¾
G. SOUTHERN				
Ord.	30	9½	55	—
Pref.	30	11	55¾	— ½
Guar.	64	26½	72	— 1½
Deb.	88⅛	51⅜	95	—

* Latest available quotation

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is 9.30 a.m. on the preceding Monday. All advertisements should be addressed to:—*The Railway Gazette*, 33, Tothill Street, Westminster, London, S.W.1.

OFFICIAL NOTICES

London and North Eastern Railway

NOTICE is hereby given that, for the purpose of preparing the Warrants for Interest payable on the 16th October, 1944, on the Company's 5 per cent. Redeemable Debenture Stock, the balance will be struck as at the close of business on 28th September, and such Interest will be payable only to those Stockholders whose names are registered on that date.

Transfers of the 5 per cent. Redeemable Debenture Stock should, therefore, be lodged with the Registrar of the Company at Hamilton Buildings, Liverpool Street Station, London, E.C.2, before 5 p.m. on 28th September.

By Order,
W. H. JOHNSON,
Secretary.

Marylebone Station,
London, N.W.1.
18th September, 1944.

Universal Directory of Railway Officials and Railway Year Book

50th Annual Edition, 1944-45, now ready

This unique publication gives the names of all the principal railway officers throughout the world, together with essential particulars of the systems with which they are connected. Much general and statistical information about railways is also concisely presented

Price 20/- net.

THE DIRECTORY PUBLISHING CO., LTD., 33, Tothill Street, Westminster, S.W.1

coaching stock of the Chicago & Eastern Illinois Railroad met that company's "Dixie Flyer" express (southbound) head-on in a heavy fog.

Road Accidents in July, 1944.—The return issued by the Ministry of War Transport of the number of persons reported to have died, or to have been injured, as a result of road accidents in Great Britain during the month of July last shows 511 deaths (compared with 384 in July, 1943), 2,842 seriously injured (compared with 2,518 in July, 1943), and 7,460 slightly injured (compared with 6,984 in July, 1943).

Berkeley Square House.—The following announcement was issued through the Press Association on September 15 by Messrs. Collins & Collins: "The Canadian Pacific Railway Company has sold its freehold interest in Berkeley Square House, Mayfair. The site occupies almost the whole of the east side of Berkeley Square, extending to nearly two acres. The property has been purchased by trustees as a permanent investment. Running into seven figures, this is one of the most important transactions which has taken place in London for many years, and was negotiated by Messrs. Collins & Collins, Chartered Surveyors, Brook Street, W.1, and the vendor's Solicitors, Messrs. William A. Crump & Son, Lime Street, E.C." It may be recalled that this site was purchased by the C.P.R. in 1931 for the construction of a large hotel. In 1936 the C.P.R. let the site on building lease, and Berkeley Square House was erected. At present it houses the Ministry of War Transport. (*See editorial note, page* 274).

Fuel Economy in Industry.—Major Lloyd George, Minister of Fuel & Power, opening a "Black Diamonds" Fuel Economy Exhibition at Bristol on September 14, warned consumers everywhere that the relaxation of the blackout did not mean the end or even the modification of the need for fuel economy this winter. Fuel economy in industry was now yielding its reward, and an important result was that the country now had more coal in stock to meet the winter demand than he had dared to expect after the strikes in the spring. The strain on our supplies, however, was even greater than last year. Major Lloyd George said that nearly 900,000 houses in London had been damaged by the flying-bomb attacks and that persons living in houses where only temporary repairs had so far been effected might well need special consideration in regard to fuel. He paid a special tribute to all those in the gas and electricity industries engaged in the maintenance and repair work necessitated by the flying bomb attack. He regarded it as his chief job this winter to keep the country warm. The approach of peace in Europe, however, did not mean an immediate return to plenty.

Wengernalp Railway.—Receipts for 1943 of this Swiss private company amounted to fr. 820,289, and exceeded expenditure by fr. 166,886 (fr. 120,732 in 1942). A total of 293,533 passengers was carried, against 255,476.

Argentine North Eastern Railway Co. Ltd.—The directors have decided to pay on October 20, 1944, a further six months' arrears of interest on the 5 per cent. "B" debentures and debenture stock of the company (namely that ended December 31, 1933) together with the 5 per cent. per annum interest on such arrears, the total amounting to £3 17s. per cent., less tax.

L.M.S.R. Station Re-naming.—The following L.M.S.R. stations are to be renamed from October 2: Harecastle (for Kidsgrove) will be re-named Kidsgrove (Central), and Kidsgrove will become Kidsgrove (Liverpool Road); Kidsgrove Halt will not be affected. Burnley (Bank Top) passenger and goods station will be renamed Burnley (Central). Coinciding with the re-naming of the Kidsgrove stations, the following signal box names will also be changed: Harecastle Junction will become Kidsgrove (Central) Junction, and Harecastle (Kidsgrove Junction) will be Kidsgrove (Liverpool Road) Junction.

Forthcoming Meetings

September 27 (*Wed.*).—Institution of Railway Signal Engineers, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2, 6 p.m. "The application of carrier telephony to British railway trunk line communications," by Mr. W. Thompson.

September 27 (*Wed.*).—Institute of Fuel, at the Institution of Mechanical Engineers, Storey's Gate. St. James's Park, London, S.W.1, 2.30 p.m. "Superheaters for water tube boilers," by Messrs. L. C. Southcott and D. W. Rudorff.

September 27 (*Wed.*).—Institute of Welding, at the Institution of Civil Engineers, Great George Street, Westminster, S.W.1, 6 p.m. Presidential address by Mr. W. W. Watt.

October 3 (*Tues.*).—Institution of Automobile Engineers, at the Institution of Mechanical Engineers, Storey's Gate, St. James's Park, London, S.W.1, 6.15 p.m. "History and conjecture," by Mr. John Shearman.

October 4 (*Wed.*).—Institute of Fuel, at the Institution of Mechanical Engineers, 2.30 p.m. "Thermal Insulation—I" by Dr. H. R. Fehling.

Return of London Evacuees

Scene at one of the London terminal stations last week, when evacuees returning unofficially cluttered the platforms of the termini with perambulators, cots, children's cycles, and domestic luggage of all types

Railway Stock Market

Although only moderately active, stock markets have been more cheerful, British Funds continuing firm, industrial shares showing a widespread rally, and home rails becoming a better market, a sharp recovery in the latter having checked the downward trend in evidence during recent weeks. On the other hand, there was less speculative activity in foreign stocks, including European bonds, sentiment in regard to some of the latter having been affected by the armistice terms with Rumania. French railway sterling bonds lost a small part of their recent big advance. Argentine rails moved back, the further debenture interest payments not having influenced sentiment which was dominated by the latest political developments in the Republic and by the statements at the Anglo-Argentine Tramways meeting showing the manner in which this company has been treated by the Argentine authorities. Among Indian rails, Barsi Light Railway ordinary stock moved up to 118, while elsewhere, Mexican Railway 6 per cent. debentures were better at 15 on rumours of possible purchase of the undertaking. Canadian Pacifics reflected the improved tendency in dollar stocks.

The welcome and long-overdue rally in home rails reflected better demand, buyers having at last been attracted by the big yields which range up to 9 per cent. on L.N.E.R. second preference. Moreover, at current improved levels, the return on L.M.S.R. ordinary still exceeds 8¼ per cent., while Southern deferred yields over 8 per cent., and Great Western not far short of this rate. Moreover, L.N.E.R. first preference and L.M.S.R. 1923 preference return over 7 per cent., and Southern preferred over 6¾ per cent. There appears to be wider recognition of the view that the outlook for the main-line railways is no more obscure at this stage than that of other important industries whose prospects are bound up with Government policy and similar uncertainties. Moreover, home railway junior stocks are virtually assured of dividends at current rates so long as the control agreement is in force. Scheduled to run until at least one year after the war, which is generally assumed to mean until Japan as well as Germany is defeated, it may very well persist until there is a final decision on the position of the railways in regard to post-war transport organisation and control. Even allowing for the fact that the small yields on many industrial shares are due to hopes of improved dividends after the war, there is no logical reason why home railway junior stocks should be valued on a basis showing well over twice the average yield on industrials. Quite attractive yields also rule on L.M.S.R. senior preference and on L.N.E.R. guaranteed stocks, also on Great Western and Southern preference stocks, while debenture stocks also show a not unattractive return when judged in relation to their high-class investment status.

Compared with a week ago, Great Western moved up from 56 to 56½, although the 5 per cent. preference was fractionally lower on balance at 115½; the 4 per cent. debentures remained at 114½. L.M.S.R. ordinary rallied from 28¼ to 29⅜; the senior preference recovered from an earlier decline, and at 73¾ was unchanged on balance, as did the 1923 preference, which at 57½ was also the same as a week ago. L.N.E.R. second preference improved from 29½ to 30¼, and the first preference from 56¼ to 57. Southern deferred came in for better demand, rallying to 24⅜, compared with 23⅛ a week ago, while the preferred ordinary improved from 73¼ to 73½. Southern 5 per cent. preference was 114½, compared with 115, and the 4 per cent. debentures were again 113. London Transport "C" showed a further decline, being 66½, as against 68¼ a week ago.

Among Argentine rails, B.A. Gt. Southern ordinary eased further to 12 and the 4 per cent. debentures were 57½. B.A. Western ordinary was 10¼, and Central Argentine 8½ with the 4 per cent. and 5 per cent. debentures of the last-named company at 50½ and 55½ respectively. Elsewhere, United of Havana 1906 debentures further declined to 26. San Paulo ordinary was steady at 48 and Antofagasta was 10½. Among French rails, Nord reacted from 89 to 86, and Midi & Orleans declined from 77 to 73½. Canadian Pacifics rallied from 14¾ to 15.

Traffic Table and Stock Prices of Overseas and Foreign Railways

	Railways	Miles open	Week ending	Traffic for week: Total this year	Traffic for week: Inc. or dec. compared with 1942/3	No. of Weeks	Aggregate traffics to date: Totals 1943/4	Aggregate traffics to date: Totals 1942/3	Aggregate traffics to date: Increase or decrease	Shares or stock	Prices: Highest 1943	Prices: Lowest 1943	Prices: September 19, 1944	Yield % (See Note)
				£	£		£	£	£					
South & Central America	Antofagasta (Chili) & Bolivia	834	10.9.44	28,590	+ 1,820	36	1,060,830	1,027,670	+ 33,160	Ord. Stk.	15¾	10	11	Nil
	Argentine North Eastern ...	753	9.9.44	17,250	+ 3,510	10	166,632	145,326	+ 21,306	,,	7⅜	5	5	Nil
	Bolivar	174	Aug., 1944	5,854	+ 1 346	35	42,517	41,913	+ 604	6 p.c. Deb.	22½	18	17½	Nil
	Brazil	—	—	—	—	—	—	—	—	Bonds	23½	19	19	Nil
	Buenos Ayres & Pacific ...	2,807	9.9.44	112,080	+ 16,980	10	1,129,260	854,220	+ 275,040	Ord. Stk.	8¼	5¼	5½	Nil
	Buenos Ayres Great Southern	5,080	9.9.44	173,460	+ 17,160	10	1,663,020	1,467,240	+ 195,780	Ord. Stk.	17⅛	9½	12	Nil
	Buenos Ayres Western ...	1,924	9.9.44	68,160	+ 15,540	10	615,120	496,680	+ 118,440	,,	16	9⅞	10½	Nil
	Central Argentine	3,700	9.9.44	179,307	+ 38,472	10	1,712,691	1,332,093	+ 380,598	,,	10¾	6¼	8½	Nil
	Do.	—	—	—	—	—	—	—	—	Dfd.	4⅞	3	4	Nil
	Cent. Uruguay of M. Video	972	9.9.44	29,487	+ 8	10	311,151	316,985	– 5,834	Ord. Stk.	7⅛	4½	4½	Nil
	Costa Rica	262	July, 1944	28,322	+ 5,071	4	28.322	23,251	+ 5,071	Stk.	16	12½	15½	Nil
	Dorada	70	Aug, 1944	29,875	+ 4,645	35	207,565	172,147	+ 35,418	I Mt. Deb.	96	92	100½	£5 19.5
	Entre Rios	808	9.9.44	22,056	+ 1,302	10	226,764	204,636	+ 22,128	Ord. Stk.	9	5¼	5	Nil
	Great Western of Brazil ...	1,030	9.9.44	18,300	+ 4,100	36	767,900	561,000	+ 206,900	Ord. Sh.	59/9	24/4½	31/3	Nil
	International of Cl. Amer. ...	794	July, 1944	$577,243	– $3,278	30	$4,777,756	$4,485,160	+ $292,596	—	—	—	—	—
	Interoceanic of Mexico ...	—	—	—	—	—	—	—	—	1st Pref.	2¾	1⅛	1	Nil
	La Guaira & Caracas... ...	22¾	Aug., 1944	9,355	+ 2,070	35	64,295	68,425	– 4,130	5 p.c. Deb.	90	80	79	6¼
	Leopoldina	1,918	9.9.44	55,113	+ 19,162	36	1,655,361	1,233,541	+ 421,820	Ord. Stk.	7¾	4	5	Nil
	Mexican	483	7.9.44	ps. 442,500	+ ps.85,700	10	ps. 4,650,700	ps. 4,015,900	+ ps. 634,800	Ord. Stk.	1⅛	¾	⅜	Nil
	Midland Uruguay	319	July, 1944	18,039	+ 1,585	4	18,039	16,454	+ 1,585	—	—	—	—	—
	Nitrate	382	15,9,44	6,187	– 490	37	132,243	108.825	+ 23,418	Ord. Sh.	83/9	71/3	68/9	£3 11 1½
	Paraguay Central	274	8.9.44	$62.775	+ $5,345	10	$572,937	$556.660	+ $16,277	Pr. Li. Stk.	75	51½	71	8⅜
	Peruvian Corporation ...	1,059	Aug., 1944	127,085	+ 20,162	9	245,725	206,941	+ 38,784	Pref.	17⅜	10¼	11	Nil
	Salvador	100	June, 1944	c 80,000	– c 26,000	52	c 1,484,000	c 1,243,000	+ c 241,000	—	—	—	—	—
	San Paulo	153½	—	—	—	—	—	—	—	Ord. Stk.	71	57	48	£4 3.4
	Taltal	156	Aug., 1944	3,720	– 2,495	9	5,535	9,730	– 4,195	Ord. Sh.	37/6	20/–	17/6	Nil
	United of Havana	1,301	9.9.44	47,613	+ 1,777	10	480,559	517,947	– 37,388	Ord. Stk.	1/16	3¼	3	Nil
	Uruguay Northern	73	July, 1944	1,438.	+ 51	4	1,438	1,387	+ 51	—	—	—	—	—
Canada	Canadian Pacific	17,035	14.9.44	1,260,600	+ 62,600	37	44,578,800	40,301,600	+ 4,277,200	Ord. Stk.	18	13⅞	15	3⅓
India†	Barsi Light	202	July, 1944	24,878	– 3,817	17	100,365	91,770	+ 8,595	—	—	—	—	—
	Bengal-Nagpur	3,267	July, 1944	988,650	– 17,775	17	4,183,275	4,235,325	– 52,050	Ord. Stk.	104¼	101¼	121½	£35/10
	Madras & Southern Mahratta	2,939	Mar., 1944	358,125	– 7,925	52	10,447,866	8,913,924	+ 1,533,924	—	—	—	—	—
	South Indian	2,349	20.12.43	199,410	+ 24,449	37	5,321,558	4,562,445	+ 750,113	—	—	—	—	—
Various	Egyptian Delta	607	20.8.44	19,270	+ 4,226	20	259,759	197,214	+ 62,545	Prf. Sh.	6 1/16	2⅞	4	Nil
	Manila	—	—	—	—	—	—	—	—	B. Deb.	45	32	61½	Nil
	Midland of W. Australia ...	277	July, 1944	19,178	– 15,047	4	19,178	34,225	– 15,047	Inc. Deb.	101	93	99½	£40/5
	Nigerian	1,900	24.6.44	246,920	– 7,585	4	—	—	—	—	—	—	—	—
	South Africa	13,291	19.8.44	842,234	– 1,952	19	17,520,621	16,594,138	+ 926,483	—	—	—	—	—
	Victoria	4,774	April, 1944	1,188,999	– 212,162	—	—	—	—	—	—	—	—	—

Note. Yields are based on the approximate current price and are within a fraction of 1/16. Argentine traffics are given in sterling calculated @ 16⅔ pesos to the £

† Receipts are calculated @ 1s. 6d. to the rupee